A STUDY OF ABDOMINAL WALL HERNIAS

Dissertation Submitted to the

TAMILNADU DR.MGR MEDICAL UNIVERSITY,

in partial fulfillment of the requirements for the degree of

MASTER OF SURGERY

IN

GENERAL SURGERY

THE TAMILNADU Dr.MGR MEDICAL UNIVERSITY, CHENNAI

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I hereby declare that this dissertation/thesis entitled "A STUDY OF ABDOMINAL WALL HERNIAS" is a bonafide and genuine research work carried out by me under the guidance of Prof.Dr.SOUNDARARAJAN,M.S., Professor of Surgery, Department of Surgery, TIRUNELVELI MEDICAL COLLEGE HOSPITAL.,TIRUNELVELI.

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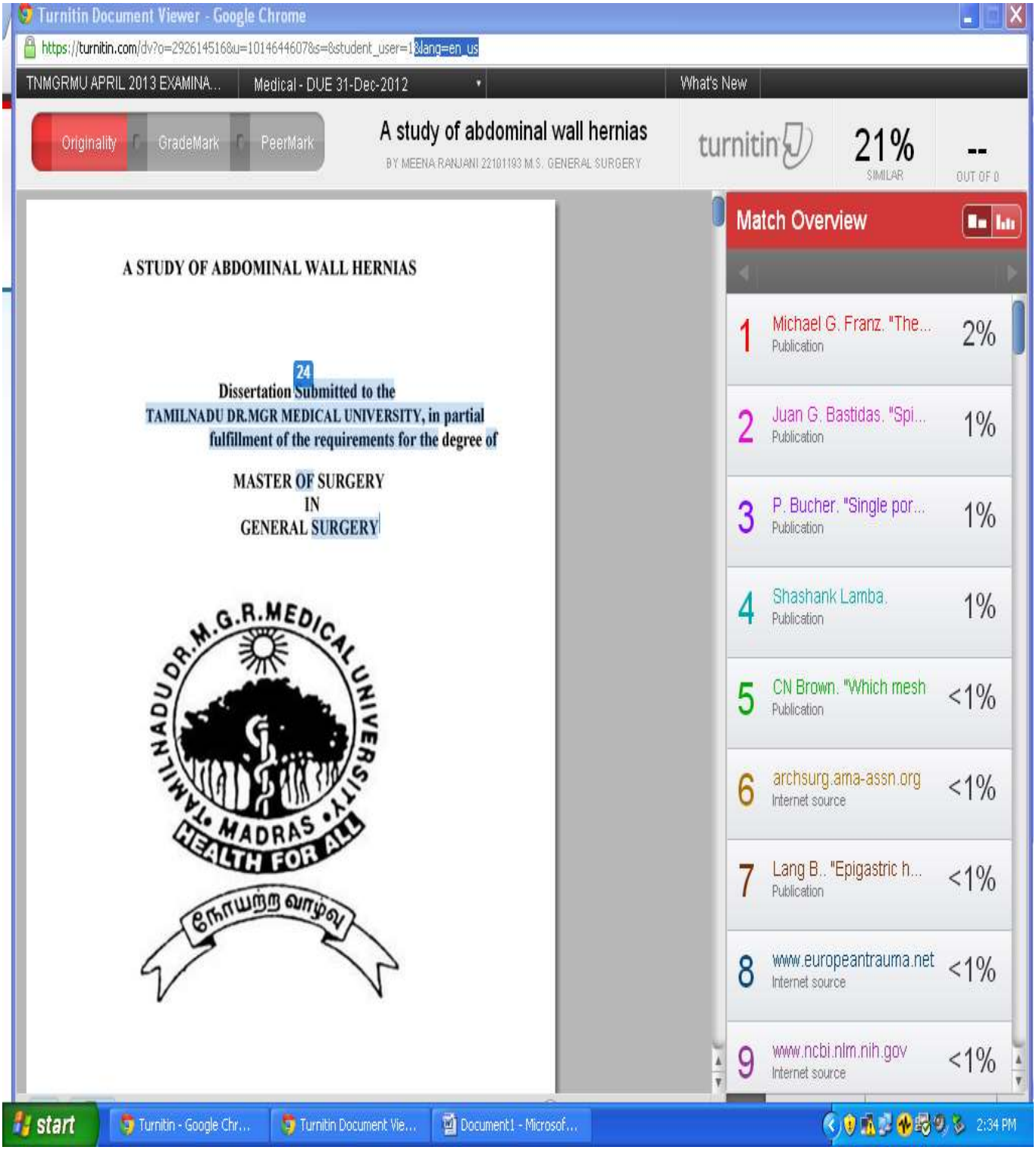
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TABLE OF CONTENTS

LIST ABBREVATIONS USED

1. BPH- benign prostatic hypertrophy
2. Cm –centimeter
3. COPD- chronic obstructive pulmonary disease
4. CT- computerized tomography
5. DVT- deep vein thrombosis
6. ePTFE -expanded polytetrafluroethylene
7. IPOM- intra peritoneal on lay mesh repair
8. LSCS- Lower segment caesarian section
9. MI- myocardial infarction
10. N/CM- Newton/ centimeter
11. PE – Pulmonary Embolism
12. RCT- randomized control trial
13. SSI- surgical site infection
14. TAPP- Tran abdominal pre peritoneal repair
15. TEP-totally extra peritoneal repair
16. USG- ultra sonogram 17. UTI- urinary tract infection

INTRODUCTION

Sir Astely Paston Cooper's words: *"No disease of the human body belonging to the province of the Surgeon requires in its treatment a better combination of accurate anatomical knowledge with surgical skill than Hernia in all its varieties"*

Abdominal wall hernias are familiar surgical problem. Abdominal wall hernias are those that appear through the layers of abdominal walls at sites of weakness. They occur both due to congenital and acquired defects. Hernias commonly cause pain and are aesthetically distressing to patients. This coupled with the risk of incarceration, is the most common reason patient seeks surgical repair of hernias. Advances in the basic and clinical sciences have allowed a better understanding of the pathophysiology of hernia formation. The field of hernia repair has evolved as a result of surgical innovation and has benefited significantly from technologic improvements.

The tension-free repair is one of the key concepts that have revolutionized hernia surgery. The use of mesh prosthesis to approximate the fascial defect has resulted in a decrease in recurrence rates for inguinal and incisional hernias. More recently, laparoscopic approaches to the inguinal and incisional hernia have extended the options and approaches for repairing the fascial defect. .However, large abdominal incisions and wide tissue dissection with the creation of large flaps often lead to a high incidence of postoperative morbidity and wound complications. Nowadays, open ventral herniorraphy has been challenged by reports of successful implementation of minimally invasive techniques. The benefits of laparoscopic ventral hernia repair (LVHR) include a faster convalescence, fewer complications, and, most important, a low recurrence rate.

The Stoppa repair used a large mesh in the preperitoneal space to support the fascial defect, which is the concept upon which the laparoscopic inguinal hernia repair is based. Contemporary repair of abdominal wall hernias is supported by strong evidence and calls for a tension-free repair with placement of mesh in the majority of cases. Laparoscopic repair demands significant expertise to achieve outcomes comparable with those of open repair. In ventral incisional hernias, placement of the mesh in a sub lay position has been found to be effective and to have a low recurrence rate, although randomized trials have not been performed.

Incisional hernia, a late complication of laparotomy, still lacks an evidence-based prophylactic approach. Postoperatively, incisional hernias occur because of multiple factors. Preoperative co morbidities belong to these risk factors. There is a range of studies comparing the techniques of surgical wound closure, suture materials differences and newer techniques of repair.

This study focuses on preventable factors and hence treating the high risk patient with preventive strategy. In this thesis, I have made an attempt to study all cases of ventral hernias admitted to our hospital during the period January 2011 to September 2012, regarding their varied presentations, etiology and wide range of surgical options used in the management.

AIM AND OBJECTIVE OF STUDY

1) To study about the incidence and presentation of various types of abdominal wall hernias. .
2) To evaluate for obvious etiological factors and identifying contributory risk factors such that they can be eliminated.
3) To analyze the various surgical modalities and treatment performed at this institution.

INCLUSION CRITERIA

All cases of abdominal wall hernias presenting above 12 yrs of age

EXCLUSION CRITERIA

Age <12 yrs

Inguinal and femoral hernias

REVIEW OF LITERATURE

Evolution of Ventral Incision Hernia Repair

> *''If we could artificially produce tissues of the density and toughness of fascia and tendon the secret of the radical cure of hernia would be discovered'*

This statement of THEORDER BILLROTH inspired the academic researchers for the prosthetic material. Synthesis of plastic began in the twentieth century, and nylon was the first material widely available as suture. Publications document the use of nylon mesh during World War II in France. Unfortunately, nylon loses tensile strength due to hydrolysis and denaturation and is associated with hernia recurrence. During the 1950s and 1960s, polypropylene and Dacron were introduced.

The evolution of modern ventral hernia repair began in 1958 when Francis Usher published the first of his many papers describing the use of polypropylene mesh for tension-free hernia repairs. This mesh was rightly recognized as a huge leap forward in the reduction of recurrence rates after hernia repairs. He placed oversized mesh deep to the abdominal wall musculature to allow for adequate overlap.

Studies show increased trend in mesh usage from 35% in 1987 to 66% in 1999 .Current practice for the repair of Incisional hernias is the selective placement of mesh in patients based on the surgeon's preference and experience.

Polypropylene is inexpensive, easy to handle, and incorporates well into the abdominal wall. Clinical experience with polypropylene has demonstrated some complications when it is placed intraperitoneally, including adhesion formation, erosion into abdominal viscera, and fistula formation. Intestinal

adhesions not only result in future bowel obstructions, female infertility, and abdominal pain but also increase the risk of bowel injury during subsequent abdominal surgery. They also increase subsequent operative time, the conversion rates from laparoscopic to open procedures, and the incidence of postoperative complications.

This realization led to the development of ‘‘second-generation’’ mesh, the barrier meshes, which provide a protective layer to prevent intraperitoneal contents from adhering to the prosthetic. With the prevention of adhesions as the goal, these barrier meshes are designed to prevent in growth of viscera into the mesh. These meshes have been partly responsible for the popularization of the underlay technique of ventral hernia repair, primarily with the laparoscopic approach.

Solid polytetrafluoroethylene (PTFE) was used for the first time in hernia surgery in 1959. Solid PTFE was plagued by high recurrence rates due to low tensile strength and lack of incorporation within tissue. Expanded PTFE (ePTFE) was later developed in Japan and was used mainly in the intraperitoneal position. Unlike 1polypropylene, ePTFE has a low incidence of visceral erosion, bowel obstruction,fistulization, abscess formation, due to rapid coverage with mesothelium and less adhesion formation .

Another strategy to reduce adhesion formation and visceral erosion is the use of composite meshes which have been shown to form fewer adhesions of weaker strength. Composite meshes generally consist of two sides a ‘‘non-tissue in growth’’ side that faces viscera and a ‘‘tissue incorporating’’ side against the abdominal wall. Composite mesh shows decreased rates of adhesion formation one year after implantation..

The implantation of mesh and the resultant inflammatory reaction may also lead to the formation of a rigid scar plate with loss of abdominal wall pliability and changes in abdominal wall compliance. Patients may complain of a sensation of stiffness, physical discomfort, and limitations in activities of daily living. Light weight meshes have been associated with decreased complaints of pain, paresthesias, and improved abdominal wall compliance. due to reduced polypropylene content and larger pore size.

Hernia repair in the setting of a contaminated surgical field requires either a staged repair or primary tissue repair.

1. Absorbable polyglactin (Vicryl) prosthetics have been used for hernia repair associated with contaminated operative fields. Using absorbable prosthetic material is that the mesh supports the in growth of host repair tissues and then degrades when the repair is functionally stable.

2. Biologic prostheses are useful when the wound is contaminated or the risk of infection is high. porcine dermal collagen, a cellular dermal matrix, porcine intestinal mucosa, have been used safely and effectively as an alternative to traditional mesh to successfully repair hernias in contaminated operative fields

Techniques in the repair of ventral incisional hernias that reduce tension without the use of prosthetic material include the component separation technique and the use of preoperative tissue expansion.

1. The component separation technique was initially reported in 1990 and is based on enlargement of the abdominal wall surface by separation of the anterior abdominal muscular layers. Because no prosthetic material is required, this technique can be used in contaminated wounds. Recently published interim data demonstrate favorable outcomes when comparing component separation with prosthetic mesh repair.

2. Preoperative tissue expansion can be used to facilitate reapproximation of tissue without tension. Two reported methods of tissue expansion consist of progressive pneumoperitoneum and implantation of tissue expanders.

Progressive pneumoperitoneum – with the advantages of detection of multiple fascial defects, approximation of natural tissues without tension, and preoperative lysis of adhesions. Progressive pneumoperitoneum is achieved by insufflations of air at regular intervals via percutaneous puncture or indwelling intra abdominal catheters.

The use of implanted tissue expanders was first described to repair congenital and posttraumatic defects. Gradual expansion is thought to provide natural innervated healthy tissue that can be used for reapproximation of the fascial defect. Expanders can be placed in the subcutaneous, inter muscular, intramuscular, and intra-abdominal positions.

More complex abdominal wall reconstructions have been described. Use of the tensor fascia lata flap was described to close lower abdominal wall defects in 1946 and use of the rectus femoris in 1977. Recently, use of a free vascularised composite anterolateral thigh flap with tensor fascia lata has been described Complications associated with flaps include donor site morbidity, flap necrosis, flap shrinkage, and hernia recurrence.

ANATOMY OF ABDOMINAL WALL

9 LAYERS OF ABDOMINAL WALL:

Skin: Langers line run transversely. Incisions along the line heal as fine scars, while across margins retract.

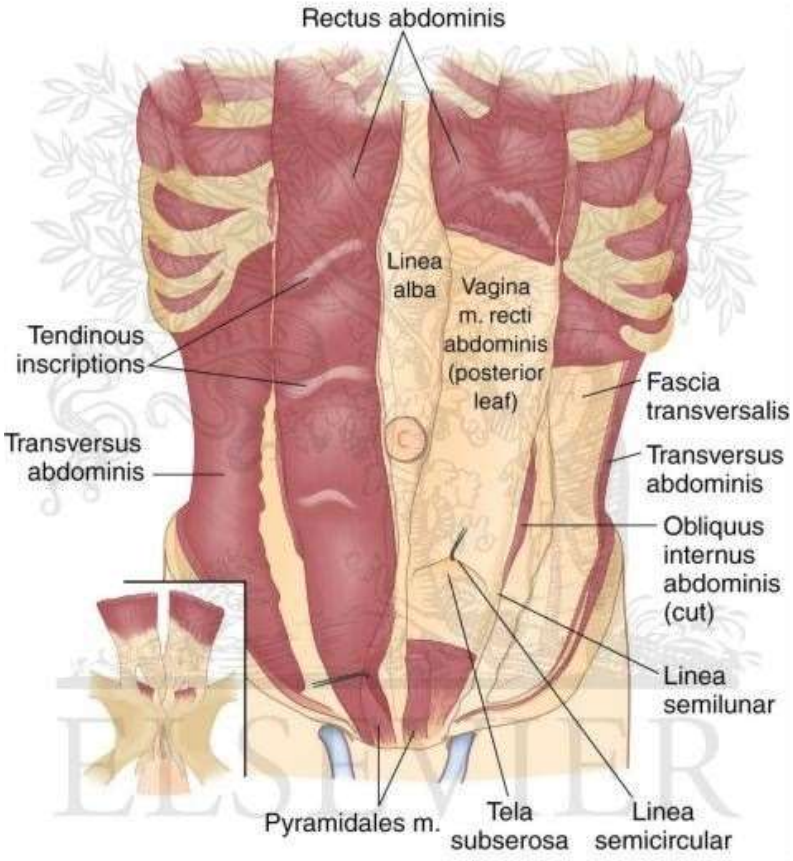
Superficial fascia: camper –fatty layer

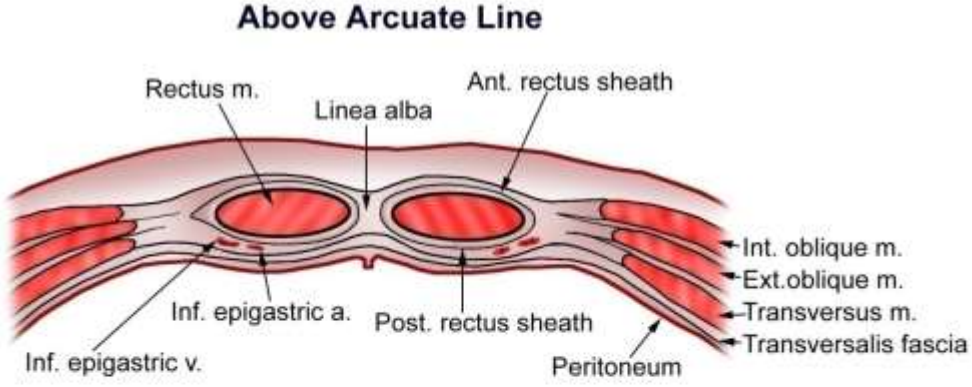
Scarpa –connective tissue layer aids proper alignment of skin after surgical incisions

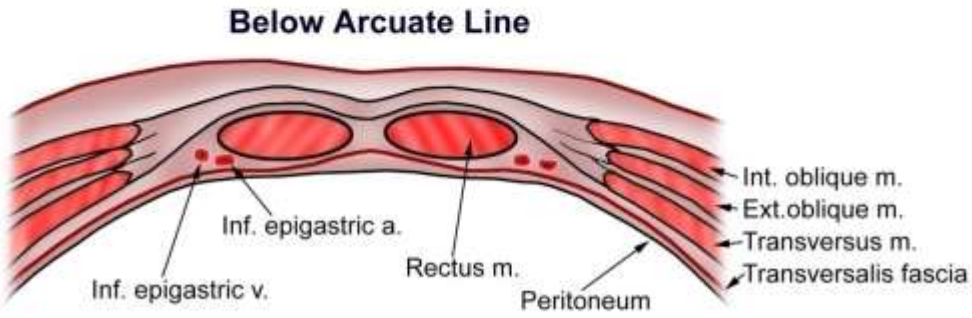
MUSCLES: External oblique abdominis, internal oblique abdominis and transverse abdominis form the muscular component of the abdominal wall giving rise to anteriorly flat aponeurosis investing the rectus abdominis muscle.

Transversalis fascia forms the complete facial envelope of abdominal cavity and is responsible for structural integrity of abdominal wall.

Rectus abdominis is a paired flat muscle composed of long parallel fascicles interrupted by three to five tendinous interceptions and contraction of those muscles flexes vertebral column.


Rectus abdominis
Linea alba
Vagina m. recti abdominis (posterior leaf)
Tendinous inscriptions
Fascia transversalis
Transversus abdominis
Transversus abdominis
Obliquus internus abdominis (cut)
Linea semilunar
Pyramidales m.
Tela subserosa
Linea semicircular


Above Arcuate Line
Rectus m.
Linea alba
Ant. rectus sheath
Int. oblique m.
Ext.oblique m.
Transversus m.
Transversalis fascia
Inf. epigastric a.
Post. rectus sheath
Inf. epigastric v.
Peritoneum


Below Arcuate Line
Int. oblique m.
Ext.oblique m.
Transversus m.
Transversalis fascia
Inf. epigastric a.
Rectus m.
Inf. epigastric v.
Peritoneum

RECTUS SHEATH FORMATION:

Above semicircular line---anteriorly external oblique, anterior layer of internal oblique ---Posteriorly -post lamina of internal oblique, transverse abdominis, and tranversalis fascia.

Below semicircular line anteriorly----external oblique, anterior, posterior lamina of internal oblique, transverse abdominis.----Posteriorly- transversalis fascia.

Lower abdomen has weak support posteriorly.

The linea alba consists of a band of dense, crisscross fibers of the aponeurosis of the broad abdominal muscles that extends from the xiphoid to the pubic symphysis and holds rectus in apposition. It is much wider above the umbilicus than below, thus facilitating the placement of surgical incisions in the midline without entering either the right or left rectus sheath.

Preperitoneal Space and Peritoneum

The preperitoneal space lies between the transversalis fascia and the parietal peritoneum and contains adipose and areolar tissue. Coursing through the preperitoneal space are the following structures:

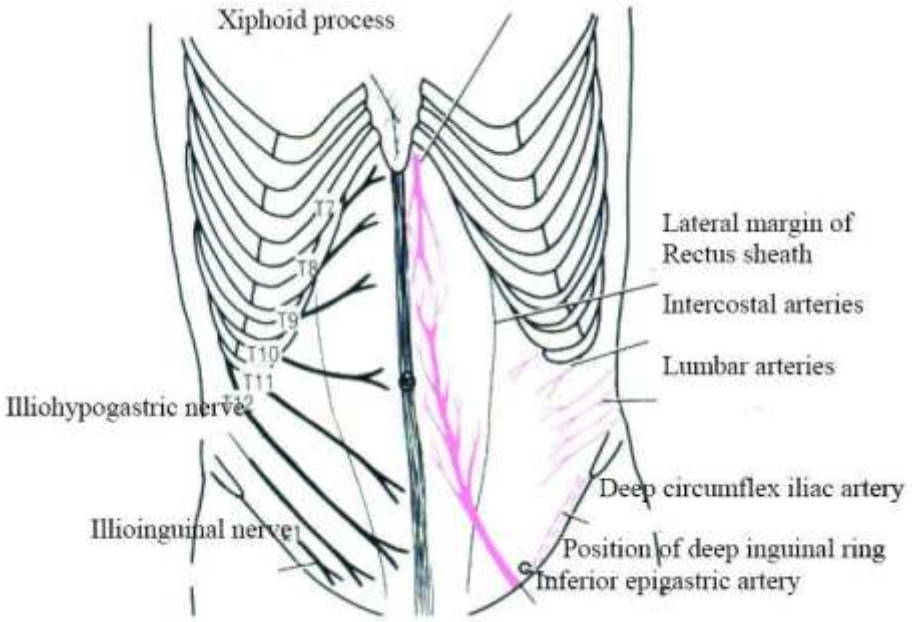
1. Inferior epigastric artery and vein
2. Medial umbilical ligaments (which are the vestiges of the fetal umbilical arteries)
3. Median umbilical ligament (which is a midline fibrous remnant of the fetal allantoic stalk or urachus)

VASCULAR SUPPLY:

Last 6 intercostal and 4 lumbar arteries. They enter through lateral margin of rectus sheath between internal oblique and transverse abdominis.

NERVE SUPPLY:

Lower 5 intercostal, between internal oblique, transverse abdominis, piercing rectus laterally. Importance-- Transverse incisions cause less nerve damage: muscles to be retracted laterally to avoid injury.



UMBILICUS :

Umbilical ring of linea Alba:

Superiorly round ligament,paraumblical veins,

Inferiorly thin median umbilical ligament.

Up to 2 yrs congenitally umbilical hernia occurs. They have. Spontaneous regression.

POSTEROLATERAL ABDOMINAL WALL:

8muscles in 3 layers:

Superficial - external oblique abdominis, lattismus dorsi

Middle - internal oblique, erector spinae, serratus posterior

Deep - quadratus lumborum, psoas major, transverse abdominis.

Superior lumbar triangle:

Erector spinae, serratus posterior, internal oblique

Inferior lumbar triangle:

Lattismus, external oblique, iliac crest

CLASSIFICATION OF ABDOMINAL WALL HERNIAS

A.CONGENITAL:

1. OMPHALOCOLE
2. GASTROCHISIS
3. UMBILICAL

B.ACQUIRED:

1. MIDLINE:

DIASTASIS RECTI

EPIGASTRIC

ADULT UMBILICAL

PARAUMBILICAL

2. MEDIAN

SUPRAVESICAL

3. PARAMEDIAN:

SPIGELIAN

INTERPARIETAL.

C.INCISIONAL;

D. OTHERS:

TRAUMATIC

TROCAR SITE

PARASTOMAL

LUMBAR

E.NO HERNIAL SAC:

ABDOMINAL WALL DIASTASIS

EVENTRATION OF ABDOINAL WALL

AETIO PATHOGENESIS

1. CONGENITAL CAUSES:

APERTURES IN LINEA ALBA, APONEUROSIS, LINEA SEMILUNARIS

DEFECTIVE UMBILICUS, CONGENITAL MUSCLE DEFECT

.**2. ACQUIRED CAUSES:**

CONDITIONS THAT WEAKEN THE WALL OR RAISE INTRA ABDOMINAL PRESSURE.

POSTOP INCISIONAL

CHRONIC STRAIN

STRETCHING RELAXATION—PREGNANCY, OBESITY

TRAUMA.

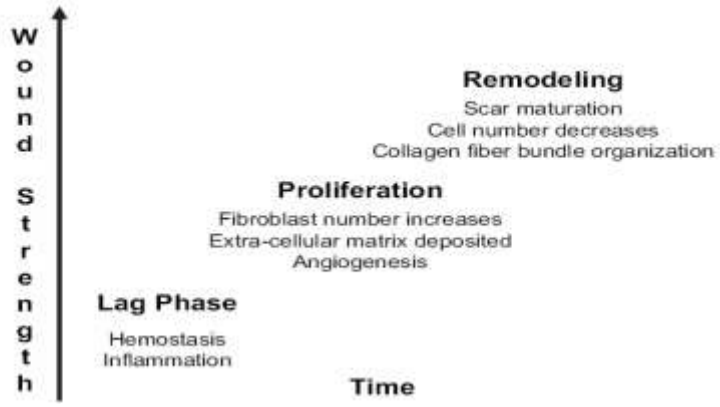
PATHOPHYSIOLOGY

Abdominal wall hernias occur when tissue structure and function are lost at the load-bearing muscle, tendon, and fascial layer. The fundamental biologic mechanisms are primary fascial pathology or surgical wound failure. In both cases, cellular and extra cellular molecular matrix defects occur. Acquired collagen defects were ascribed to cigarette smoking and nutritional deficiencies. Secondary fascial pathology occurs following acute laparotomy wound failure. This is in large part due to the replacement of fascial planes with scar tissue. The incidence of recurrent incisional hernia increases with each attempt at repair. Straining at coughing and weight lifting, can induce secondary changes in tissue fibroblast function within load-bearing tissues of recurrent incisional hernias.

Primary hernias are the result of a connective tissue disorder, whereas secondary hernias (e.g., incisional hernias) are most frequently due to technical failure, inducing a chronic wound. Recurrent hernias likely are a combination of both mechanisms.

Examples:

1. Lathyrism is an acquired disorder of the connective tissue that predisposes to hernia formation. A diet high in chickpeas inhibits collagen cross-linking leading to a laxity in fascial planes2. Ehlers-Danlos syndrome is a collection of collagen isoform disorders, also predisposing to hernia formation.3. Patients with large-vessel aneurysmal disease express pathologic extra cellular matrix metabolism, predisposing to dilated aortas and hernias.



Incisional hernia tissues express more soluble (immature) collagen, increased ratios of early wound matrix collagen isoform (collagen III), and increased tissue matrix metalloprotease levels. A decreased ratio of type I: type III collagen mRNA and protein was measured in the hernia ring and skin specimens obtained from patients with incisional hernias.

Surgical wound healing

Phases of acute wound healing: lag phase as hemostasis, inflammation, fibro-proliferative phase (scar formation), and wound remodeling phase. A defect or delay in the activation of any of the repair pathways expressed during normal laparotomy and hernia repair may lead to hernia formation. Wound infection, wound ischemia, and steroids all delay parts of the surgical wound-healing pathway.

Early mechanical wound failure (fascial dehiscence)

The majority of incisional hernias appear to develop following the mechanical disruption of laparotomy wounds occurring during the initial ‘‘lag phase’’ of the wound-healing trajectory

In lag phase, the laprotomy wound is the weakest and any insult causes wound failure and occult dehiscence that later forms incisional hernia. It is found that the true rate of laparotomy wound failure is closer to 11% and that the majority of these (94%) go on to form incisional hernias during the first 3 years after abdominal operations. Most incisional hernias and recurrent inguinal hernias originate from clinically occult dehiscences. The overlying skin wound heals, concealing the underlying myofascial defect.

Mechanism of incisional hernia formation

Sutures hold tissues together until breaking strengths are achieved. When acute wound failure occurs it results in Burst abdomens, or acute fascial dehiscence with evisceration... Acute wound healing fails when there is a deficient quantity or quality of tissue repair.

Inadequate hemostasis owing to platelet dysfunction or poor technique can result in hematoma formation with ensuing mechanical disruption of a provisional wound matrix. A delayed or deficient inflammatory response can result in wound contamination or infection with abnormal signaling for progression into the fibro- proliferative phase of acute tissue repair. A prolonged inflammatory response owing to the presence of a foreign material, like a mesh implant, or wound infection will delay the progression of acute wound healing into the fibro-proliferative phase, where rapid gains in breaking strength should occur.

Overall tissue strength of a wound is essentially zero during this inflammatory phase, thus an excessive or prolonged inflammatory response as is seen with foreign bodies, like suture or mesh material, or infections predispose to wound failure. Steroids can reduce wound inflammation, but also inhibit collagen synthesis and wound contraction; synergistically impeding tissue repair .Relative fascial or tendon wound ischemia might also induce fibroblast cell cycle arrest. This would occur, for example, when a suture line is closed too tight, or in a patient who is in shock and soft-tissue perfusion is reduced. An Ischemic laparotomy repair might also be deficient in the components and cofactors required for DNA and protein synthesis, again resulting in repair fibroblast cell-cycle arrest. Finally, too little or too much tension across the laparotomy tendon repair may disturb the optimal set point of a normal mechanic-transduction mechanism, again resulting in premature laparotomy wound fibroblast cell-cycle arrest.

Rate of healing of tissues differ. Native tissues with collagen bundles organized in a parallel orientation, such as fascia, ligament, or tendon, regain breaking strength faster than tissue with a more complex, three-dimensional fiber network, such as in the dermis.

Repairing process requires both energy and adequate nutritional building blocks. Patients, who are malnourished or actively catabolic, such as in the systemic inflammatory response syndrome, demonstrate impaired healing. Vitamins C, A, and B6 each are required for collagen synthesis and cross-linking. Deficiencies in vitamins B1 and B2 as well as zinc and copper cause syndromes associated with poor wound repair. Finally, essential fatty acids are required for cell synthesis, particularly in areas of high cell turnover such as healing wounds.

As collagen bundles of the abdominal wall are oriented transversly, transverse incisions herniated less compared to Midline incisions. A transverse suture line is therefore mechanically more stable, as it encircles tissue collagen bundles, rather than splitting them. Most laparotomy wound disruptions progressing to incisional hernias begin to form within 30 days of laparotomy wound closure.

EPIGASTRIC HERNIA:

FIRST DESCRIBED BY LEVILLE IN 1812.

COMMON IN MALES. MOSTLY IN ELDERLY, MULTIPARA.

Epigastric hernias are hernias of the linea alba occurring between the umbilicus and the xiphoid. Although congenital epigastric hernias have been described in infants, they are usually considered an acquired condition. A number of theories have been suggested to explain the origin and development of epigastric hernias, but controversies still prevail. Most likely, hypothesis links the cause of epigastric hernias to the vascular lacunae that form when the small neurovascular bundles that run between the transversalis fascia and the peritoneum, perforate the linea alba. Over periods of increased abdominal tension, preperitoneal fat derived from the falciform ligament is forced along these blood vessels enlarging the fascial defect, and an epigastric hernia is eventually formed.

Askar and widely, quoted an intrinsic weakness in the linea alba fibers. they noted that the linea alba is formed by the decussation of the tendinous aponeurotic fibers of the muscular layers passing from one side to the other, and that epigastric hernia occur exclusively in patients who had single, instead of triple, anterior and posterior lines of decussation. This finding could not, however, be confirmed by other investigators. Instead, Korenkov and colleagues

found that the biomechanical characteristics of the linea alba are not governed by the number of aponeurotic crossings but by the thickness and density of the fibers, and that the weak type of linea alba aponeurosis may be a predisposing factor for the development of a hernia . About 20% of epigastric hernias are multiple and about 80% are located just off the midline. Fascial defects vary in size from only millimeters to several centimeters. Most epigastric hernias, however, are small and are made up of preperitoneal fat only with no peritoneal sac; these are especially prone to incarceration and strangulation. Frequently, the preperitoneal fat herniating through this small defect grows over time and becomes chronically incarcerated. Larger hernias with a peritoneal sac mostly contain omentum, but also contain any upper intraperitoneal organ such as small bowel, colon, or stomach; these hernias seldom incarcerate or strangulate.

Clinical presentation and diagnosis

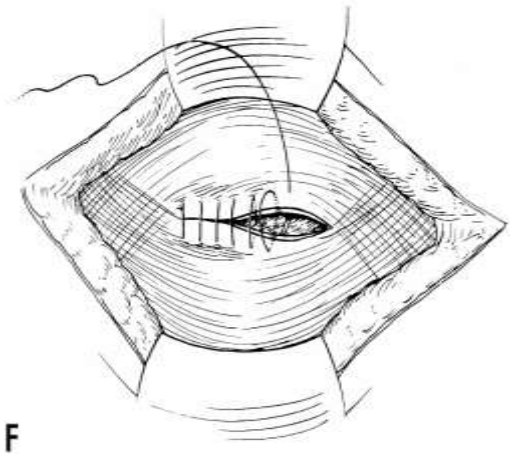
Epigastric hernias account for 1.6% to 3.6% of all abdominal wall hernias and are three times more common in men than in women. Common in between the third to fifth decades of life, with a noticeable drop in incidence after the sixth decade, revealing a close association to physical activity of an individual and not a degenerative disease as in other types of hernia.

Symptoms are related to the defect size and the hernia content. Small hernias typically present with epigastric pain that is usually related to the compression of the neurovascular bundle by the herniated preperitoneal fat. The pain may be associated with an epigastric mass, which can be difficult to palpate in obese individuals. Chronically incarcerated hernias are often confused with lipomas. Most large reducible hernias, on the other hand, are asymptomatic or may cause minimal discomfort. Incarceration produces an acutely painful mass along with symptoms related to the involved organs and their viability.

The diagnosis is usually easy to make on physical examination. Epigastric hernias should be distinguished from diastasis recti, which is a weakening and broadening of the entire linea Alba above the umbilicus. Occasionally, when the diagnosis is uncertain, especially in obese patients, ultrasonography or CT scan may be used to detect the hernia defects.

Treatment

Epigastric hernias, even if asymptomatic, should be repaired at time of diagnosis because of the risk of incarceration. Most epigastric hernias, especially the small and single ones, and those that are acutely or chronically incarcerated are usually repaired through an open approach. A targeted midline incision is used. The presence of other occult fascial defects should be ruled out as recurrence may be occasionally due to failure to recognize and repair multiple small defects. The preperitoneal fat or hernia sac is reduced or excised without enlarging the defect. If the defects are multiple and contiguous, the fascial bridges between the necks should be left in place if possible but more often than not, the defects are connected together. The fascia around the defect is often thin and weak, and primary repair is not advised unless the defect is less than 3 mm .A mesh repair is otherwise always performed; adequate options include an underlay mesh, a mesh plug, or a combination of onlay and underlay mesh . In one series of 57 epigastric hernias ranging in size from 0.5 cm to 5 cm and repaired under local anesthesia with a mesh plug in all but 4 cases, no recurrences were noted, with follow-up ranging from 4 to 60 months. Laparoscopic epigastric hernia repair is a good alternative to open repair in larger hernias and in those that are multiple. The falciform ligament and the peritoneum must be taken down to allow the visualization of the entire epigastric fascia and the identification of hernias only containing preperitoneal fat.



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UMBILICAL HERNIA

The incidence of umbilical hernia in the adult is largely unknown but most cases are thought to be acquired rather than congenital. It is known to occur more commonly in adult females with a female: male ratio of 3:1. Umbilical hernia is also more commonly found in association with processes that increase intra-abdominal pressure, such as pregnancy, obesity, ascites, persistent or repetitive abdominal distention in bowel obstruction, or peritoneal dialysis. The etiology of umbilical hernia in the adult may be multifactorial, with increased intra-abdominal pressure working against a weak or incomplete umbilical scar.

The umbilicus represents a midline opening in the linea Alba. Whenever the umbilical scar closes incompletely in the child or fails and stretches in later years in the adult patient, the hernia becomes readily apparent. once the abdominal contents move through the umbilical opening given the relative lack of soft tissue in the anterior body wall at the site of the umbilicus as a swelling.

Site of attachment of lower tendinous insertions of rectus abdominis to lateral border of linea alba seems to be the critical spot for Para umbilical hernia.

Adult umbilical and paraumblical hernias are common in obese females. Strangulation is common in females.

Infantile umbilical hernia: At birth, when the umbilical cord is manually ligated, the umbilical arteries and vein thrombose and the umbilical aperture closes. Any defect in the process of umbilical closure will result in an umbilical hernia through which omentum or bowel can herniate.:thro defective umbilical ring. Adult Para umbilical—thro weak spot in linea alba either above or below. 

In obesity umbilicus pulled laterally and downward causing midline weakness

Increased intra abdominal pressure - gross ascites due to liver failure, congestive heart failure, nephrotic syndrome, malignancy-multiple pregnancies

PRESENTATION

10% of all infants are born with an umbilical hernia; the incidence is as high as 20% in African-American infants versus 3% in white neonates, and is increased in association with certain disease states (Beckwith- Wiedemann syndrome, Down's syndrome).Increased incidence in premature babies. There are no significant gender differences. Infantile umbilical hernias are most often asymptomatic, they rarely incarcerate.

Adult umbilical hernias are more common in women than men and are most likely to occur in the fifth and sixth decades of life. They usually present as a bulge at the umbilicus that is usually asymptomatic but can cause discomfort or pain.

Diagnosis is almost always clinical. Complications of umbilical hernias are few, with strangulation, incarceration, or evisceration being reported in 5% of patients. Hernias smaller than 1.5 cm in diameter become incarcerated twice as often as do larger hernias. In cirrhotic patients with ascites, skin ulceration and necrosis may lead to rupture with chronic ascitic fluid leak or peritonitis.

Treatment

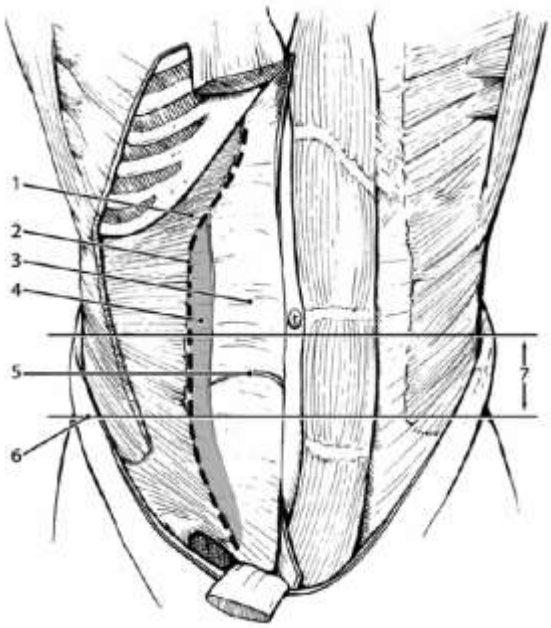
Upto 2yrs of age umbilical hernias can be safely managed by observation, for resolving spontaneously. If hernias are symptomatic, extremely large, or persisting beyond age 2,they should be repaired. Most defects can be managed with simple primary closure. Adult umbilical hernias should be surgically

repaired as early as possible. The presence of cirrhosis and ascites should not discourage repair, as strangulation, incarceration, and rupture are particularly dangerous in patients with these disorders. Significant ascites, however, should first be thoroughly treated, and nutrition optimized as morbidity and recurrence rate are much higher after hernia repair in these patients.

The modern adult umbilical hernia repair is attributed to William J. Mayo, who used the technique of overlapping abdominal wall fascia in a ‘‘vest-over-pants’’ manner. Currently, however, a mesh repair, using either a mesh plug or a mesh sheet based on the size of the hernia, is favored. Studies show significantly higher recurrence in suture repair group(11%) compared to mesh repair (1%); there did not appear to be a significant relationship between recurrence rate and size of the hernia .

Prolene hernia system was primarily developed for repair of inguinal hernias, now days this novel technique is being increasingly employed for the management of epigastric and umbilical hernias too. In the last decade, laparoscopic ventral hernia repairs have been shown to be safe and effective techniques and have been used for large adult umbilical hernias; advantages include shorter operating time, less use of postoperative drains, lower complication rates, and earliar return to normal activities. It is an attractive option for umbilical hernias larger than 3 cm in diameter and in recurrent hernias of any size.

SPIGELIAN HERNIA

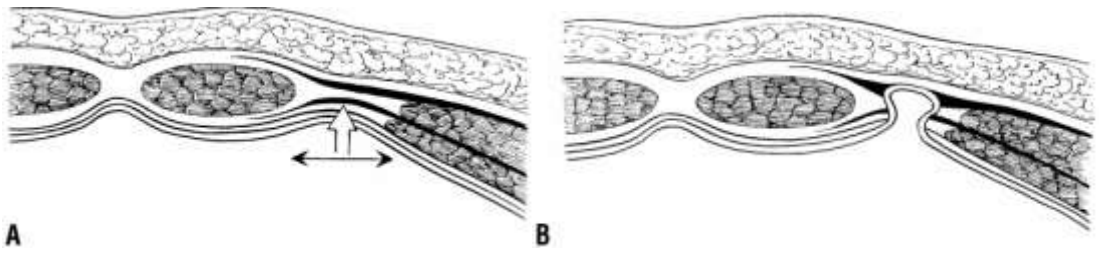


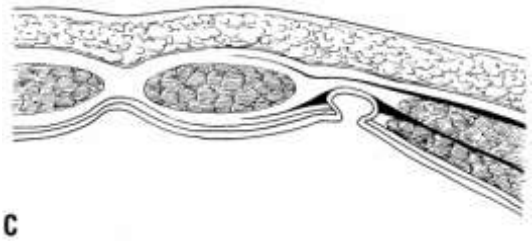
1. TRANSVERSE ABDOMINIS
2. SEMILUNAR LINE
3. POSTERIOR RECTUS SHEATH
4. SPIGELIAN APONEUROSIS
5. ARCUATE LINE
6. ANTERIOR SUPERIOR ILIAC SPINE

ANT ABDOMINAL WALL

SPIGELIAN HERNIA

Adrian van den Spigel described what is known as ‘‘spontaneous lateral ventral hernia,’ as a hernia through the spigelian fascia, which is the aponeurotic layer between the lateral edges of the rectus abdominis muscle medially and the semilunar line laterally.(transition line between the muscular and aponeurotic portions of the transversus abdominis muscle)





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D

Spigelian hernia. **A.** Breaching the spigelian fascia. **B.** The most common type has passed through the transversus abdominis and the internal oblique aponeuroses and is spreading out in the interstitial layer posterior to the external oblique aponeurosis. **C.** The less common type in the interstitial layer between the transversus abdominis aponeurosis and the internal oblique muscle.

D. The least common subcutaneous type.

Spigelian hernias mostly occur along any point along the spigelian fascia. They almost always develop at or below the arcuate line, probably because of the absence of posterior rectus sheath at that level. In addition, the fibers of the spigelian aponeurosis run in a parallel fashion below the umbilicus instead of crossing one another at right angles, becoming vulnerable to separation by preperitoneal fat. In fact, 90% of Spigelian hernias are found within the Spigelian hernia belt of Spangen, which is a 6-cm transverse strip above the line joining both anterior superior iliac spines, and where the spigelian fascia is wider and weaker. Lower hernias are rare and should be differentiated from direct inguinal or supravesical hernias. In most cases, the hernia defect is small less than 2 cm

with well-defined and firm margins. Spigelian hernias are normally acquired conditions, although congenital cases have been reported in children. Predisposing factors include morbid obesity, multiple pregnancies, rapid weight loss, chronic obstructive pulmonary disease, chronic constipation, prostatic enlargement, ascites, trauma, and previous surgery weakening the semilunar line.

Clinical presentation and diagnosis

Spigelian hernias represent 0.12% to 2.4% of all abdominal wall hernias, although their incidence appears to be increasing, given the improved detection on cross-sectional imaging. They present most commonly in the fifth and sixth decades of life, but can be seen at any age. They have a slightly higher preponderance in women (female to male ratio, 1.4: 1).The diagnosis of a Spigelian hernia is elusive and requires a high index of suspicion, given its rarity, the vague associated abdominal complaints, and the frequent lack of consistent physical findings.

Presentation varies, depending on the size, the type, and the contents of the hernia. In patients with a reducible hernia, the most common symptoms are pain, which is usually intermittent and nonspecific, and a lateral bulge or mass when standing. Many patients, however, present with a hernia-related complication, given the small size of the hernia orifice; incarceration at the time of operation is seen in 17% to 24% of reported hernias.

Clinical examination alone fails to detect any findings in 36% of patients and can be falsely positive in up to 50% of cases. As most hernias are small and covered by a usually intact external oblique aponeurosis, it is difficult to palpate a hernia or a hernia defect. Persistent point tenderness in the spigelian aponeurosis with a tensed abdominal wall is often the only sign upon physical examination that suggests the diagnosis.

Imaging is recommended before surgical exploration, especially when the diagnosis is in doubt. Ultrasonography is accurate in displaying defects in the spigelian fascia; it is easy to perform and not expensive, but is operator dependent. Modern helical CT is probably more accurate. Only occasionally is diagnostic laparoscopy required to establish the diagnosis in patients with unclear acute or chronic pain.

Treatment

Spigelian hernias should always be surgically repaired in view of the high frequency of incarceration. Repair of this hernia has traditionally been accomplished with a targeted transverse incision and primary tissue repair. This is often possible with low tension, given the typically small size of the hernia defect, and the repair is relatively durable.

The addition of mesh to the open repair of Spigelian hernias has led to improved outcomes. The various reported techniques involving mesh include intra- and preperitoneal sublay mesh placement, obliteration of the ring by a preformed polypropylene mesh umbrella type plug , or a combination of preperitoneal underlay mesh connected to an overlay mesh lying over the internal oblique muscle. No series report recurrences after mesh.

Laparoscopic repair was first reported in 1992. Intraperitoneal, transabdominal preperitoneal, and totally extra peritoneal laparoscopic techniques with underlay mesh placement have been described .In a prospective randomized trial comparing 11 open and 11 laparoscopic (8 TAPP, 3TEP) Spigelian hernia repairs, laparoscopy was shown to have a significantly lower morbidity and shorter hospital length of stay; no recurrences were noted in either group, with mean follow-up of 3.4 years.

INCISIONAL HERNIA

Incisional hernia is a common and often debilitating complication after laparotomy. Despite significant advances in many areas of surgery, correction of incisional hernias continues to be problematic, with recurrence rates ranging from 5% to 63% depending on the type of repair used. Recurrence rates are likely underestimated because of a lack of long-term follow-up and objective criteria in the literature to determine true recurrence.

More than 2 million laparotomies are performed annually in the United States, with a reported 2% to 11% incidence of incisional hernia. It is the most common complication after laparotomy by a 2:1 ratio over bowel obstruction and is the most common indication for reoperation by a 3:1 ratio over adhesive small bowel obstruction. The associated morbidity secondary to incarceration, strangulation, and bowel obstruction is significant.

Incisional hernias are the only abdominal hernias that are iatrogenic. Controversy exists regarding the ideal treatment of incisional hernias. Nowhere in surgery does the phrase ‘‘if there are multiple ways of fixing a problem then there is not one good way’’ hold true more so than with incisional hernia repair.

PREDISPOSING FACTORS

1. Factors of delayed wound healing:

- Anaemia
- Diabetes
- Jaundice
- Hypoproteineimia
- Malignancy
- Irradiation
- Malnutrition

2. Factors increasing intraabdominal pressure:

- Chronic cough
- Constipation
- Stricture urethra
- Prostatomegaly

3. Factors weakening abdominal wall:

- Motor nerve injury
- Repeated pregnancy, caesarian sections.

4. Drugs:

- Steroid therapy.

2. Technical factors:

1. Type of incision:

Vertical midline incisions (as are across langer lines.)10.5% while 2.5% in paramedian incision.

Infraumbilical (as have posteriorly weak rectus sheath)

Multiple incisions

T shaped incision

Subcostal incision (nerve and muscle injury more)

2. Type of surgery:

Emergency (general condition poor with septicemia)

3. Type of suture material:

Absorbable sutures for closure

4. Technical flaws

Tension suturing (interrupted sutures increase tension while continuous suturing distributes tension) 55% recurs within 1yr.

- Inadequate homeostasis
- Dead spaces
- Improper knots
- Drain thro main wound

3. POSTOPERATIVE FACTORS:

- Wound infection
- ^^intra abdominal pressure
- Early suture removal
- Early return to activities
- Persistent predisposing factors
- Drugs like steroid

EARLY HERNIAS:

Appear soon after the surgery within wound maturation period. Involves whole wound, grows larger and rapid due to sepsis and poor technical closure.

LATE HERNIAS:

Occurs in a healed scar due to collagen defectivity.may be due to reduced hydroxyl proline,varied collagen diameter causing weakening and collagen disruption. They may start early as partial deep layer disruption unnoticedly and the muscles around the defect are thinned out. hence strangulation as such is less common if neck is wide.

Clinical Manifestations

Patient with an incisional hernia presents with a bulge in the abdominal wall originating deep to the skin scar. The bulge may cause varying degrees of discomfort or may present as a cosmetic concern. Symptoms will usually be aggravated by coughing or straining as the hernia contents protrude through the abdominal wall defect. In large ventral hernias, the skin may present with ischemic or pressure necrosis leading to frank ulceration. Presentation of the incisional hernia with incarceration causing bowel obstruction is not uncommon. This may be associated with a history of repeated mild attacks of colicky dull

abdominal pain and nausea consistent with incomplete bowel obstruction. Complaints of dull abdominal discomfort and associated nausea are common and are related to stretching of the bowel mesentery as it protrudes through the defect.

Repair principles

The presence of an incisional hernia is an indication for repair; the hernia will only enlarge in size and lead to progressive physiologic derangements. The actual size of the hernia is defined by the size of the parietal defect to be repaired, which is often significantly larger than the palpable clinical defect. This includes all secondary hernias and zones of weakened fascia.

The goals of hernia repair are as follows:

1. Visceral eventrations prevention
2. Incorporation of the remaining abdominal wall in the repair
3. Provision of dynamic muscular support
4. Tension free restoration of abdominal wall continuity

As primary suture repair causes high recurrence, there is an increased use of prosthetic mesh to provide for a ‘‘tension-free’’ repair. Hence there is a decline in recurrence rates; however, mesh-related complications, such as infection, extrusion, and fistula formation, are significant problems. Recent emphasis of the importance of restoration of midline myofascial continuity and dynamic abdominal wall support has led to the application of numerous techniques of autologous reconstruction.

Primary suture repair

Until the 1990s, simple suture repair of incisional hernias was the gold standard. Multiple retrospective studies in the literature have demonstrated high recurrence rates (25%–63%) of primary suture repair of even small (<5 cm) fascial defects.

The high recurrence rates of primary suture repair were supported in a large, prospective, randomized trial by Luijendijk and colleagues. In a study that compared mesh and primary suture repair for incisional hernias smaller than 6 cm in greatest dimension, they found a 46% recurrence rate in the primary suture repair group compared with 23% in the mesh repair group.

A long-term follow-up of the study by Burger and colleagues revealed a 10-year cumulative rate of recurrence of 63% for the suture repair group compared with 32% for the mesh repair group, which lead to the conclusion that "primary suture repair of incisional hernias should be completely abandoned."

Mesh repair :

The use of synthetic mesh in incisional hernia repairs increased from 34.2% in 1987 to 65.5% in 1999. The American Hernia Society has declared that the use of mesh currently represents the standard of care in incisional hernia repair. Placement of mesh allows for a tension-free restoration of the structural integrity of the abdominal wall.

Advantages to the use of mesh include availability, absence of donor site morbidity, and strength of the repair.

The ideal prosthetic material: should be

Nontoxic. Nonimmunogenic, nonreactive.,Tensile strength: In an average-sized human, the maximum required tensile strength to maintain abdominal closure is 16 N/cm. In general, prosthetic materials have a tensile strength more than 32 N/cm. ,Pliable,Non carcinogenic,,Limited foreign body reaction.,Sterilisable,,Lack of physical modification by body.

Rarely is there a true failure of the mesh material. Recurrences seen after mesh repair typically occur laterally at the mesh-tissue interface. The physical properties of this interface are important in determining the ultimate strength and durability of the repair.

The two most commonly used permanent prosthetic materials are polypropylene and expanded polytetrafluoroethylene (ePTFE). Polypropylene was first introduced in the 1950s by Usher. The large pore size of the polypropylene mesh allows for macrophage and neutrophil infiltration, which provides greater resistance to infection. Its porosity also allows for better fibro vascular ingrowth and a reduced incidence of seroma formation. ePTFE has a micro porous structure that minimizes cellular infiltration and tissue incorporation and is stronger than marlex and equivalent to polypropylene in terms of suture retention strength. As a result of its flexible, soft, and conforming qualities and minimal tissue ingrowth, it can be placed directly on bowel. The disadvantages of ePTFE are related to its microporous structure. The material is virtually impenetrable, which prevents host tissue incorporation and leads to seroma formation. Once infected, ePTFE requires exploration. The micropores range from 3 to 41 µ m in size, which are large enough for bacteria (1 µm) to infiltrate but too small for macrophages (> 50µ m)

Recurrence after mesh repair is rarely caused by intrinsic failure of the prosthetic material. Failure to identify healthy fascia and technical error in

securing the mesh to the fascia commonly lead to recurrence at the mesh-fascia interface. Several methods of securing the mesh to the fascia have been described, with the most common being mesh onlay, and mesh inlay, retro rectus placement, and intraperitoneal underlay. The onlay technique ,(closing the defect and placing mesh over it) is popular because it avoids direct contact with the bowel and imparts less tension on the repair. In a survey of more than 1000 surgeons, Milliken reported that 50% of surgeons use this repair without closing the fascial defect. The disadvantages are that it required wide tissue undermining, which may predispose to wound-related complications, and that the pressure required for disrupting the mesh from the anterior abdominal wall is less than other repairs.

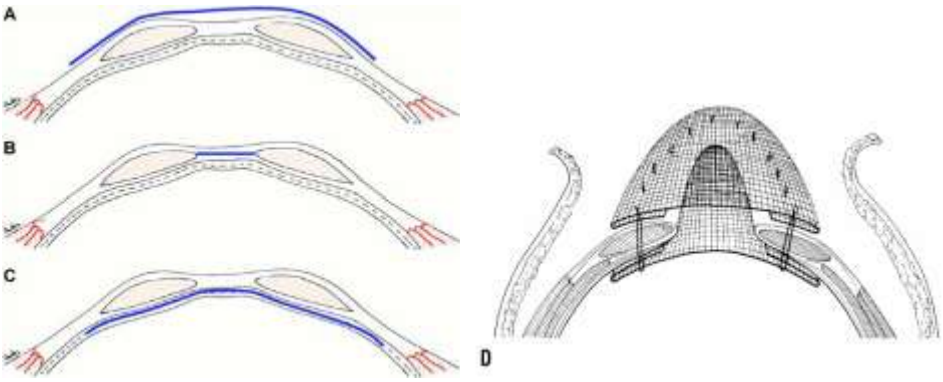
Chevrel and Rath reported their results of 389 patients and found a recurrence rate of 18.4% (n = 153) without the use of mesh compared with 5.5% (n=133) with the use of polypropylene onlay mesh and 0.97% (n = 103) with the use of fibrin glue in addition to the mesh. Their technique consisted of relaxing incisions in the anterior rectus sheath with primary approximation of the linea alba and medial turnover of the anterior rectus sheath followed by mesh placement.

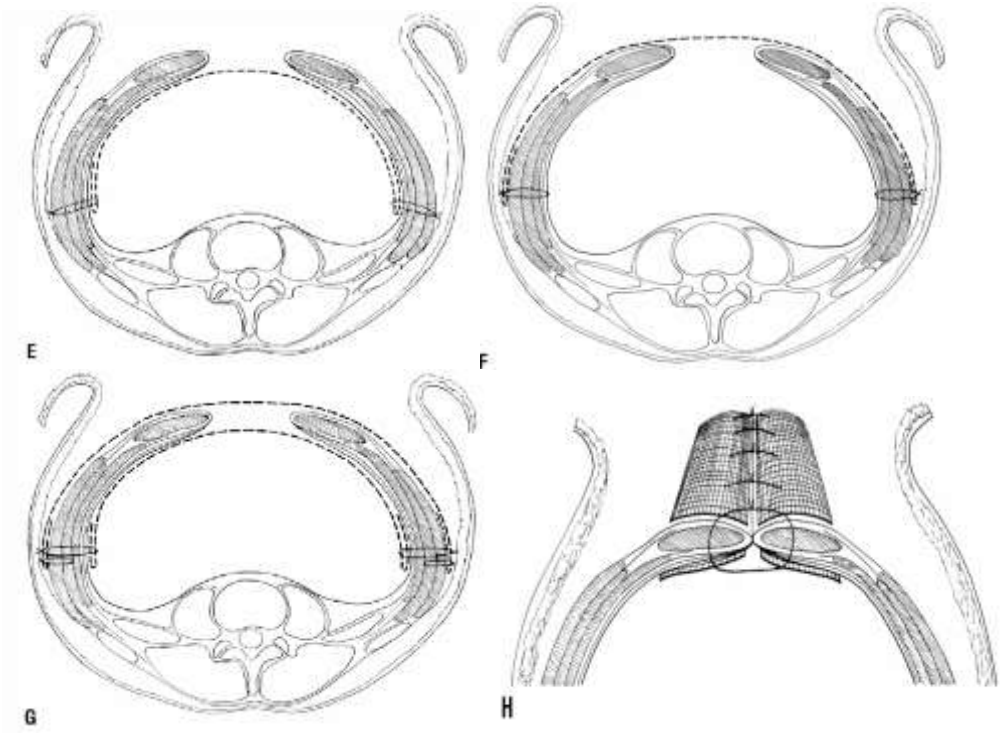
The inlay technique excises the hernial sac and identifies healthy fascial margins. This technique provides for a tensionless repair at the time of surgery and avoids the wide undermining of the onlay repair. Without the overlying support of the anterior abdominal wall, activities that increase intra- abdominal pressure impart significant tension to the mesh-fascial interface, which is the weakest point of the repair. High recurrence rates of 10% to 20% have resulted in use of other techniques to optimize strength of the mesh-fascia interface

Retrorectus placement of mesh, popularized by Rives and Stoppa, has been used with increasing frequency. here the hernial sac is preserved and used as a buffer between the mesh and underlying viscera. The mesh is placed above

the posterior rectus sheath and beneath the rectus muscle. Below the arcuate line, the mesh is placed in the preperitoneal space. It is generally recommended to place the mesh with at least 4 cm of contact between the mesh and fascia, which allows for distribution of pressure over a wider area (Pascal's principle), and the pressure-induced apposition promotes fibrous ingrowth at the mesh-fascial interface.

Prolene is shown to shrink up to 30% after implantation. By placing the mesh beneath the abdominal wall, the repair is bolstered by the anterior abdominal wall, which provides for a more secure and physiologic repair. Recurrence rates of less than 10% have been reported with this technique. Intraperitoneal underlay placement is a common technique used in open and laparoscopic approaches. Proponents of this technique cite that the ability to place the mesh with a large underlay allows for better tissue ingrowth and a more secure mesh-fascial interface . Fixation techniques vary from approximation at the fascial margins to full-thickness lateral fixation. Recurrence rates of less than 5% have been reported with this technique.





. Variations of prosthetic mesh repair for incisional hernia. **A.** Overlay graft. **B.** Inlay graft. **C.** underlay graft. **D.** Combined overlay and underlay grafts. **E.** Large underlay graft. **F.** Large overlay graft. **G.** Combined large overlay and underlay grafts. **H.** Reinforcing onlay and underlay strips of mesh.

Specific complications

1. Infection is one of the most feared complications after mesh placement. The average rate of early and late mesh infections is approximately 7% and depends on the type of mesh used. The most common organisms are Staphylococcus aureus and Staphylococcus epidermidis . Mesh salvage is still possible in the face of infection; however, in most cases mesh removal is required .mesh infection results in significant weakening, which predisposes to higher recurrence rates. Robertson and colleagues demonstrated that isolation of the incision away from the hernia repair through an abdominoplasty approach is associated with lower complication and recurrence rates. It was particularly helpful in obese patients and patients with multiple or recurrent hernias.

2. Seroma is a common complication after hernia repair and comprises up to 16% of the overall complications. Reduction of the hernia leaves a potential space for fluid accumulation. Combined with inflammation, disruption of lymphatics, and continued irritation caused by the foreign body reaction from the prosthetic material, this complication results in fluid accumulation. Seromas often resolve with time; however, continued prosthetic irritation may result in persistent seroma requiring surgical drainage.

3. Inadequate soft tissue coverage may result in mesh extrusion. Less pliable materials, such as marlex, are associated with a higher extrusion rate. When extrusion is noted mesh removal is indicated.

4. Enteric fistula formation is a potentially devastating complication that occurs when the prosthetic material erodes into the underlying bowel. Lack of omental interposition, and the presences of a fascial gap were factors associated with a higher incidence of fistula formation.

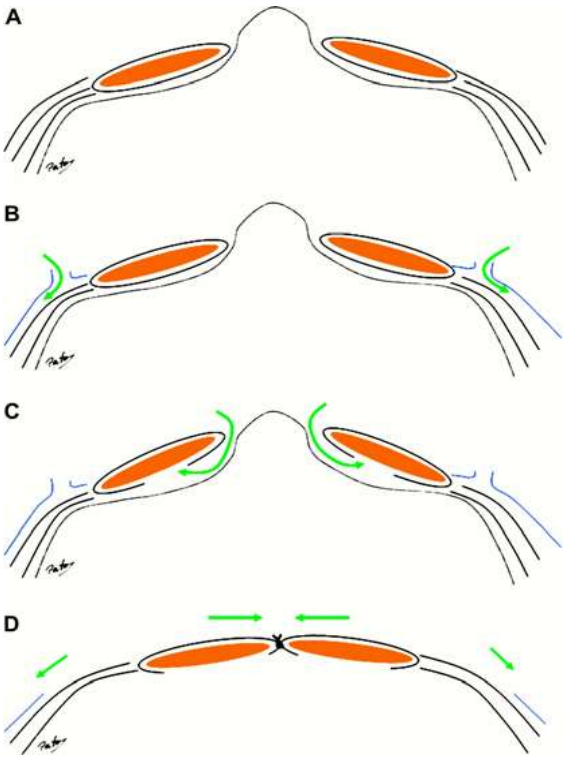
Bioprosthetics

These are biomaterials derived from human and animal tissues. These materials differ in that they heal by a regenerative process rather than by scar tissue formation. The collagen-based extracellular matrix is preserved, which allows for maintenance of mechanical integrity while providing a scaffold for host tissue regeneration. These materials have demonstrated resistance to infection, tolerance of cutaneous exposure, and mechanical stability when used in incisional hernia repair. Disadvantages are the high cost and lack of long-term follow-up studies.

Components separation technique

Ramirez and colleagues described about this technique. The evolution of the components separation technique is based on early descriptions by Vasconez and colleagues of transverse rectus abdominus myocutaneous closure that involves separation of the external and internal oblique musculature and release of the posterior sheath. Ramirez and colleagues noted that the abdominal wall is formed by overlapping muscle layers that may be separated while preserving their innervations and blood supply, specifically, elevation of the external oblique off the internal oblique while maintaining the neurovascular supply to the rectus abdominus, which travels in a segmental fashion between the internal oblique and transverses abdominus. The rectus then can be released from the posterior sheath. Once this procedure is accomplished, medial advancement of a compound flap of rectus muscle and attached internal oblique-transversus abdominus complex can be used to cover large midline abdominal defects.

Unilateral advancement of 5 cm in the epigastric region, 10 cm at the umbilicus, and 3 cm in the suprapubic region has been described. Fabian and colleagues described a modification that involved division of the internal oblique of the anterior rectus sheath, which allowed for unilateral advancement of 8 to 10 cm in the epigastric area, 10 to 15 cm in the mid abdomen, and 6 to 8 cm in the suprapubic region. A lower hernia recurrence rate, avoidance of prosthetic material, restoration of dynamic abdominal wall function, and improvement in back and postural abnormalities is noted. Wound-related complications have been problematic with this technique and are related to the wide undermining required. Recent work has demonstrated a reduction in wound-related complications with preservation of periumbilical perforators.



Components separation technique. (A) The abdominal wall formed by overlapping muscle layers that may be separated. (B) Elevation of the external oblique off the internal oblique. (C) Rectus is released from the posterior sheath. (D) Medial advancement of rectus muscle and attached internal oblique–transverses abdominus complex..

Ramirez attributed the success of the procedure to five principles:

1. Translation of the muscular layer of the abdominal wall to enlarge the tissue surface area.

2. Separation of muscle layers that allows for maximal individual expansion of each muscle unit.

3. Disconnection of the muscle unit from its fascial sheath envelope, which restricts horizontal motion and thereby facilitates expansion.

4. Abdominal wall musculature in approximately 70% of its surface is covering hollow viscus, which is more easily compressed than solid structures.

5. Bilateral mobilization works more efficiently than unilateral advancement by equilibrating forces of the abdominal wall and centralizing the midline.

Flap reconstruction

Local and distant flaps have been used to reconstruct hernia defects in which there is significant absolute loss of domain and in lateral defects that are not amenable to advancement techniques. Fasciocutaneous flaps may be used to reconstruct partial- thickness defects of the skin and subcutaneous tissues and full-thickness defects when used in combination with mesh.

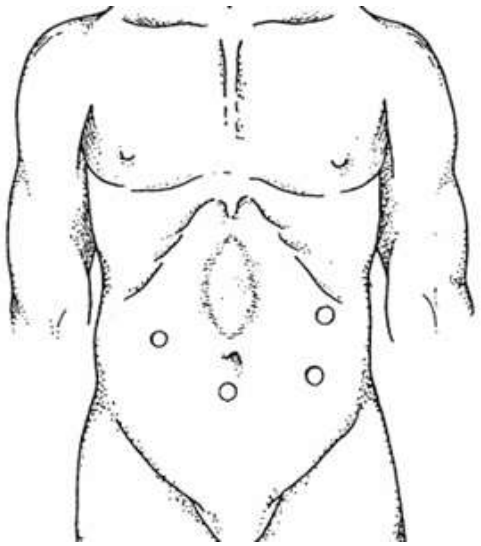
Tissue expansion

Tissue expansion has been used to provide well-vascularized, autologous, innervated tissue for abdominal wall reconstruction. Its use has been demonstrated in the reconstruction of congenital defects and large hernias. Expanders may be placed in either the subcutaneous or intermuscular plane. Placement in the avascular plane between the external and internal oblique muscles allows superficial expansion of the external oblique and deep expansion of the internal oblique-transversus abdominis musculofascial layer while preserving innervations and blood supply. Hobar and colleagues demonstrated an approximate doubling of the layers of the anterior abdominal wall with normal function and clinically demonstrated innervated composite reconstruction of defects exceeding 50% of the abdominal surface.

Laparoscopic Repair

In this technique, the defect is repaired posteriorly and no dissection within the scarred layer of anterior fascia is required. The laparoscopic approach may also allow for identification of additional hernia defects in the anterior abdominal wall during the repair.

Totally extra peritoneal repair (TEP) was developed out of concerns for possible complications related to intra abdominal access required for TAPP. This method allows for access to preperitoneal space and avoids the need for a peritoneal incision. In an extra peritoneal laparoscopic repair, access to preperitoneal space is achieved with a dissecting balloon ,a laparoscope , or blunt dissection /carbon dioxide dissection while visualizing the dissection from peritoneal cavity. Mesh prosthesis is inserted into the preperitoneal space. Technical variations exist in mesh fixation methods (tacks, no tacks or fibrin glue) and mesh configurations (wrapped around cord or 3-D).Unlike in TAPP closure of a peritoneal flap is not necessary in TEP. One of the challenging aspects of laparoscopic repair is port access into a peritoneal cavity that has been previously operated upon. In general, access can be obtained for needle insufflation via the left upper quadrant, placing the port along the anterior axillary line to avoid injury to the more laterally positioned spleen. Once insufflation has been achieved and instruments inserted, the next challenge is the extensive laparoscopic lysis of adhesions that is often necessary to gain exposure to the entire hernia defect. The goal of the adhesiolysis is to provide a 3 to 4 cm circumferential area of overlap for the mesh patch beyond the edge of the ventral hernia defect.



Demonstration of port placement for repair of a ventral hernia in the upper abdomen. Place the first trocar in the lower midline, 2 or 3 in. inferior to the ventral hernia. Ventral hernias in the lower abdomen require placement of the camera port in the upper abdomen.

After the appropriate adhesions have been taken down and the fascial edges of the defect confirmed, the sac is retracted and excised from within the hernia. The outline of the defect is then drawn on the anterior abdominal wall. Edges of the defect at the skin level can be confirmed from within the abdominal cavity using the laparoscope. The mesh is then cut to fit this defect with a margin of 3 to 4 cm on each side to provide adequate coverage and to minimize tension. Nonabsorbable sutures are placed around the circumference of the mesh and tied, but not cut. The mesh is rolled so that the anterior surface lies inside the roll, and the mesh is inserted into the abdomen through a large 10- or 12-mm port.

Once inside the abdominal cavity, the mesh is unrolled and positioned. A transfascial suture passer can be introduced through small stab incisions placed around the marked border of the defect. The suture passer retrieves the long ends of the suture that has been previously placed in the mesh, and the ends are tied at the skin level at 4 to 6 points around the repair and buried with the subcutaneous tissue in the stab incision. This affixes the mesh patch to the fascia layers around the circumference of the patch. After all sutures have been tied and cut, laparoscopically placed tacks or staples can be used to further fasten the mesh to the anterior abdominal wall. Whether the strength of the repair is imported by the trans fascial sutures or the tacks or both remains controversial.

There is significant debate among experts regarding the optimal approach for ventral incisional hernia. Advocates of laparoscopic repair argue that it is a better approach because it does not require extensive subcutaneous tissue dissection and postoperative drainage. In addition, sublay mesh placement

appears to be the most physiologic method of ventral incisional hernia repair. Laparoscopic repair of ventral hernias in obese patients and patients with large fascial defects are safe and associated with a low recurrence and complication rate.

single port technique has shown excellent short- and long-term results. Single 12-mm port positioned through an open approach midway between the anterior superior iliac spine and the costal margin on left or right flank. for ventral hernia repair, a working channel endoscope (Richard Wolf GmbH) is used with a standard straight 5- mm instrument.

Adhesions release, hernia contents release, dissection of falciform ligament, when needed, can be achieved here also.. In all cases, hernia repair is achieved by the placement of a composite mesh (Proceed™ surgical mesh, Johnson & Johnson) with at least 5-cm coverage of the normal abdominal wall all around the defect. Meshes are fixed at least with four sutures and multiple absorbable tacks (AbsorbaTack™, Covidien). The facial incision at the port site are then closed with 2/0 Maxon under vision. The median operative time is 58 min (range 45–78).

There was no intra- or postoperative complications. No recurrences were observed until now with a median follow-up of 8 months (3–13) .It is associated with excellent cosmetic results, it reproduces the standard laparoscopic technique. The single port insertion using an open cut, leaves only a single fascial wound, which may reduce the risk of incisional hernia on the port, especially in patients which have proved to be prone to abdominal wall hernias.

Robot-assisted laparoscopic incisional hernia mesh repair using exclusive intracorporeal sutures. By avoiding full-thickness sutures and tacks, this technique minimizes chronic postoperative pain and may represent an alternative to the traditional laparoscopic approach for small and medium-sized hernias.

LUMBAR HERNIA

Lumbar hernias may be either congenital or acquired and occur in the lumbar region of the posterior abdominal wall. Hernias through the superior lumbar triangle (Grynfeltt's triangle) are more common. The superior lumbar triangle is bounded by the 12th rib, Para spinal muscles, and internal oblique muscle. Less common are hernias through the inferior lumbar triangle (Pettit's triangle), which is bounded by the iliac crest, latissimus dorsi muscle, and external oblique muscle. Weakness of the lumbodorsal fascia through either of these areas results in progressive protrusion of extraperitoneal fat and a hernia sac. Lumbar hernias are not prone to incarceration.

Because of the immobile bony margins of these defects, suture repair is difficult. Repair is best done by placement of prosthetic mesh that can be sutured to the margins of the hernia.

INTERPARIETAL HERNIA:

Interparietal hernias are rare and occur when the hernia sac lies between layers of the abdominal wall. Interparietal hernias most frequently occur in previous incisions. Spigelian hernias are nearly always interparietal.

The correct preoperative diagnosis of interparietal hernia can be difficult. Many patients with complicated interparietal hernias present with intestinal obstruction. Abdominal CT can assist in the diagnosis. Large interparietal hernias usually require placement of prosthetic mesh for closure. When this cannot be done, the separation of components technique may be useful to provide natural tissues to obliterate the defect.

MATERIALS AND METHODS:

Present study is based on the analysis of cases of abdominal wall hernias observed during January 2011 to Sep 2012.the study accounts for all the cases of abdominal wall hernias that were diagnosed and treated both electively and emergency. Ethical committee clearance obtained. Consent was obtained from all patients. A simple random sampling was done for selecting the patients.

The patients related factor namely age, sex, multi parity, obesity, cough/COPD, constipation, prostatism, diabetes mellitus, hyper tension, steroid therapy, consumption of tobacco and alcohol, past surgical history were recorded. A master chart has been made recording relevant history and findings of personally studied 185 cases of ventral hernia. Routine investigations viz Hematology, Urine examination, chest x-ray, ECG, Ultrasound abdomen and Pelvis for all patients and other special investigations were done for associated diseases wherever required.

As clinical diagnosis was made, patients with medical illness were appropriately treated to attain near normal parameters before surgery. At the induction of anesthesia, prophylactic dose of antibiotic

(1st generation cephalosporin) was given. Patients were assigned to undergo suture repair or mesh repair at operating surgeon's discretion.

In suture repair continuous stitches with stitch width and interval approximately 1 cm was put using polypropylene (Prolene no. 1). In mesh repair Prolene mesh was used with at least 4 cm of mesh overlapping the approximated edges of the facial defect and secured with no. 1 Prolene interrupted stitches over the fascia. Suction drain was used for all patients with Incisional hernia and drain removed 48 to 72 hrs interval or when drain decreased. Sutures were removed on 8 post operation day.

Particular attention was given to study various aspects of ventral hernias like

- Distribution of ventral hernias with respect to age and sex of the patient.
- Types of hernia.
- Period between the previous surgery and the development of Incisional hernia.
- Etiological/predisposing factors for the development of ventral hernias.
- Common presentations.
- Exact location and size of the defect
- Various surgical options for the management of ventral hernias
- Complications in the perioperative period.
- Follow up done at 1, 6, 12, 18 months of interval following surgery.

OBSERVATIONS:

INCIDENCE OF HERNIAS: Among the 185 cases studied,86 were incisional hernia(46.4%),75 were umbilical hernia(40.5%),21 were epigastric(11.3%),1 spigelian(.005%),2 were lumbar hernia(..01%)

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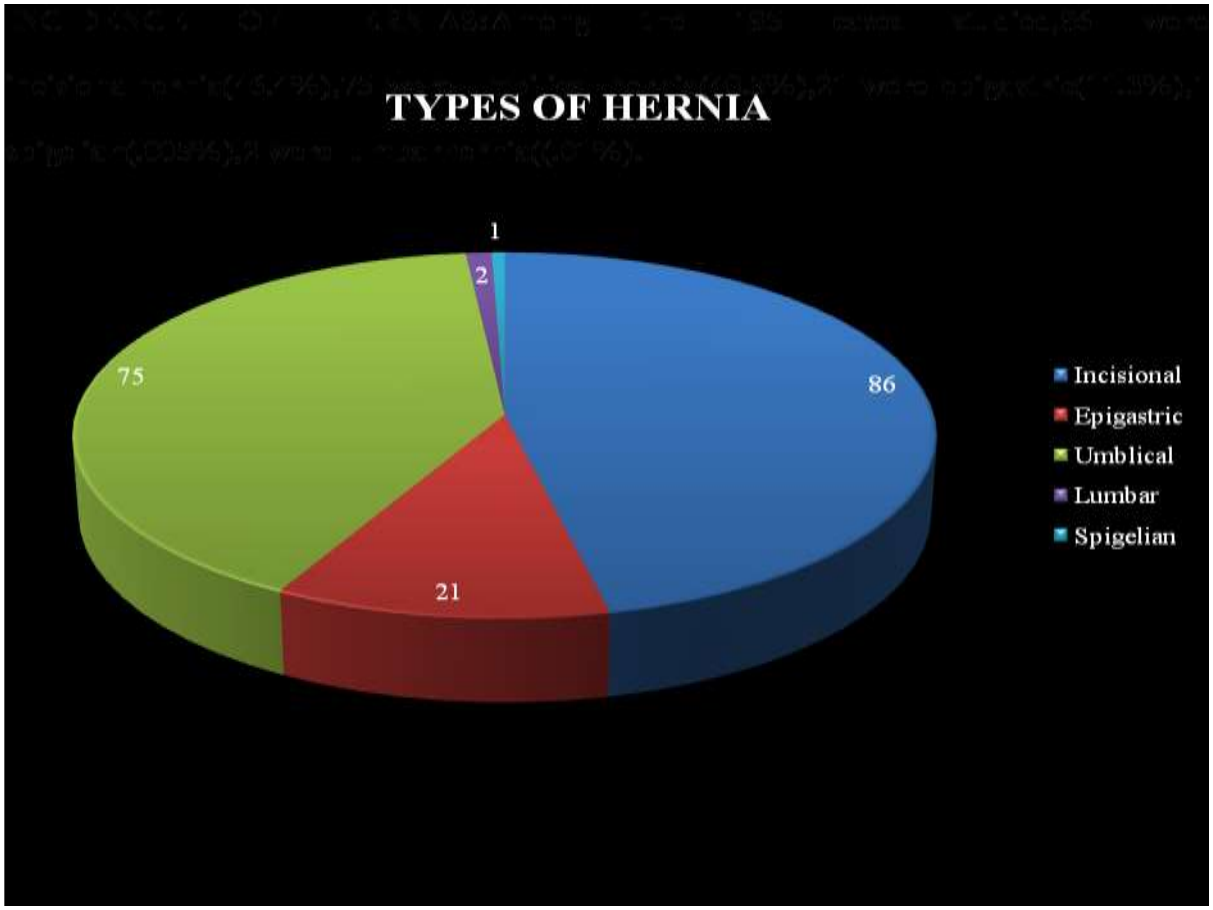
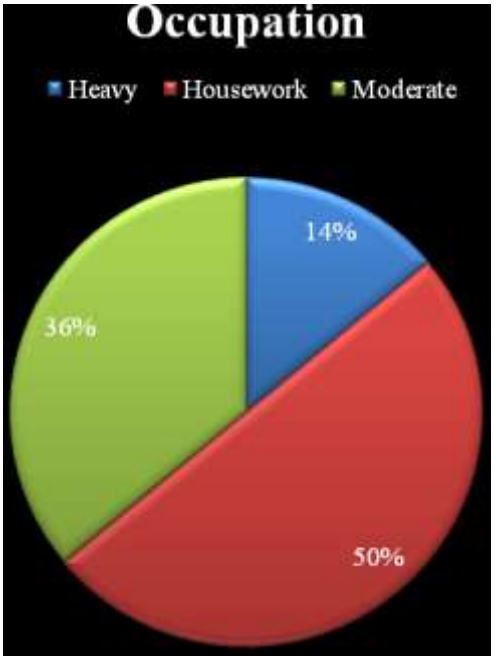


in admit age group (excluding inguinal and femoral hernia)

INCISIONAL HERNIA

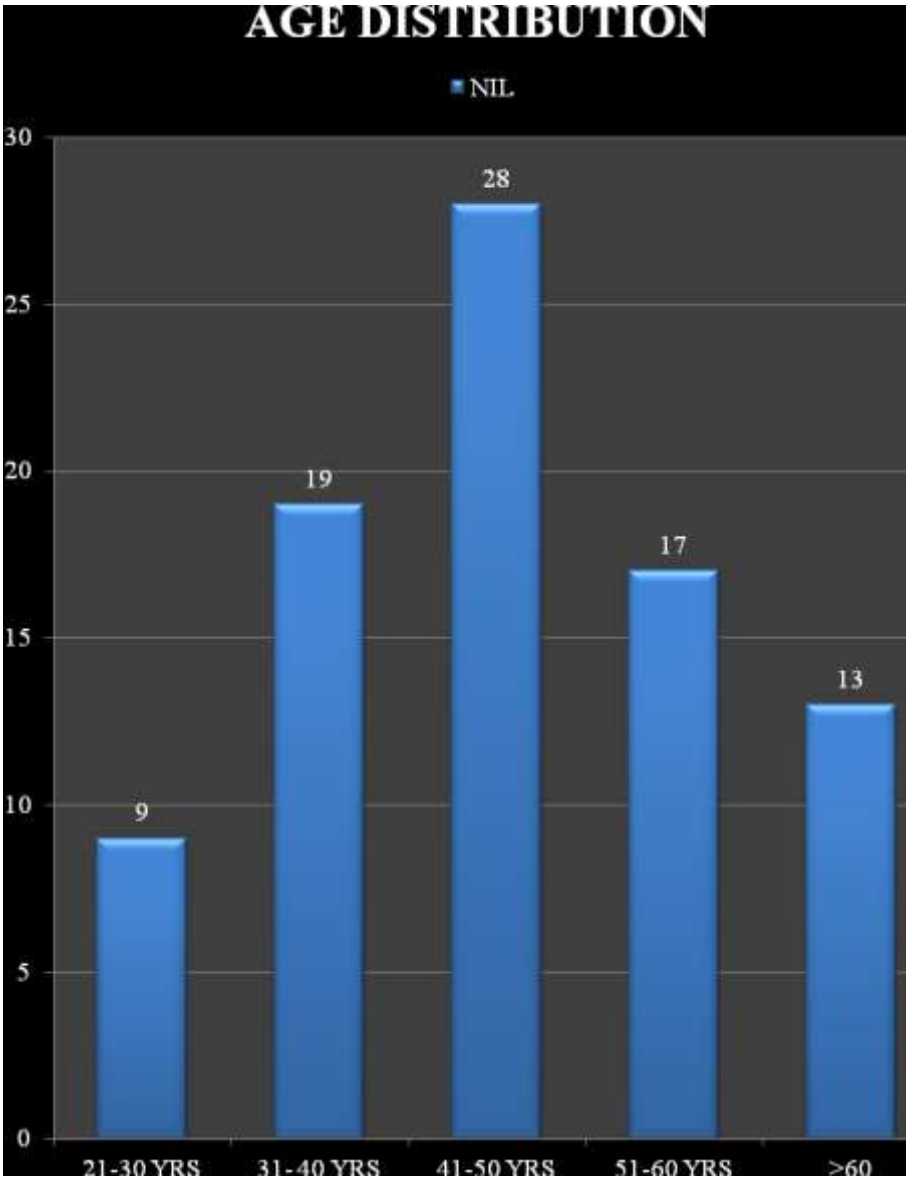
OCCUPATION :

of the 86 cases,50% were home workers,36%moderate workers,14%heavy workers. We have observed that incision hernia is common in household workers, probably their earlier return to work influenced the healing process.



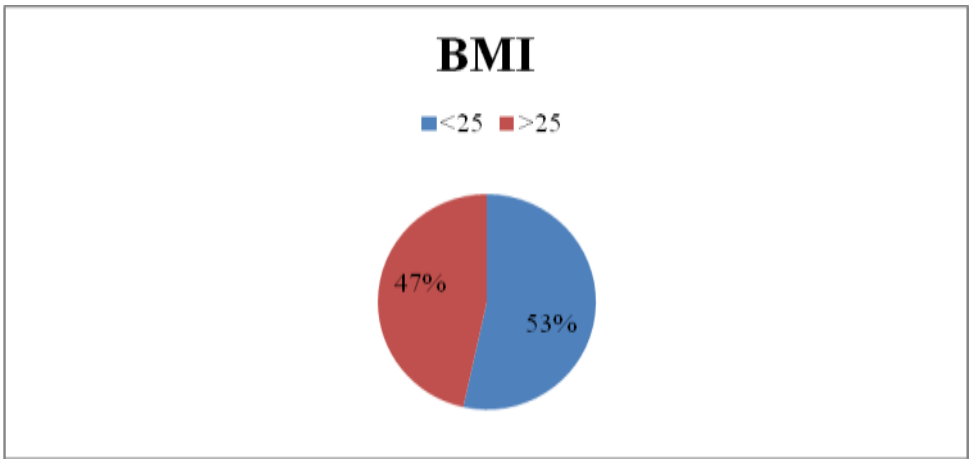
AGE DISTRIBUTION :

COMMON IN THIRD TO FIFTH DECADE.

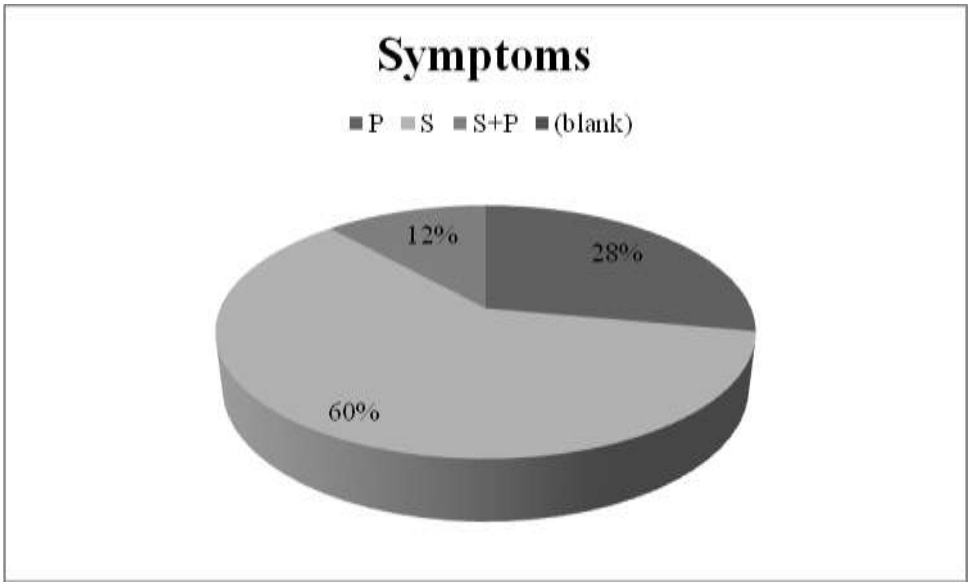


BODY MASS INDEX :

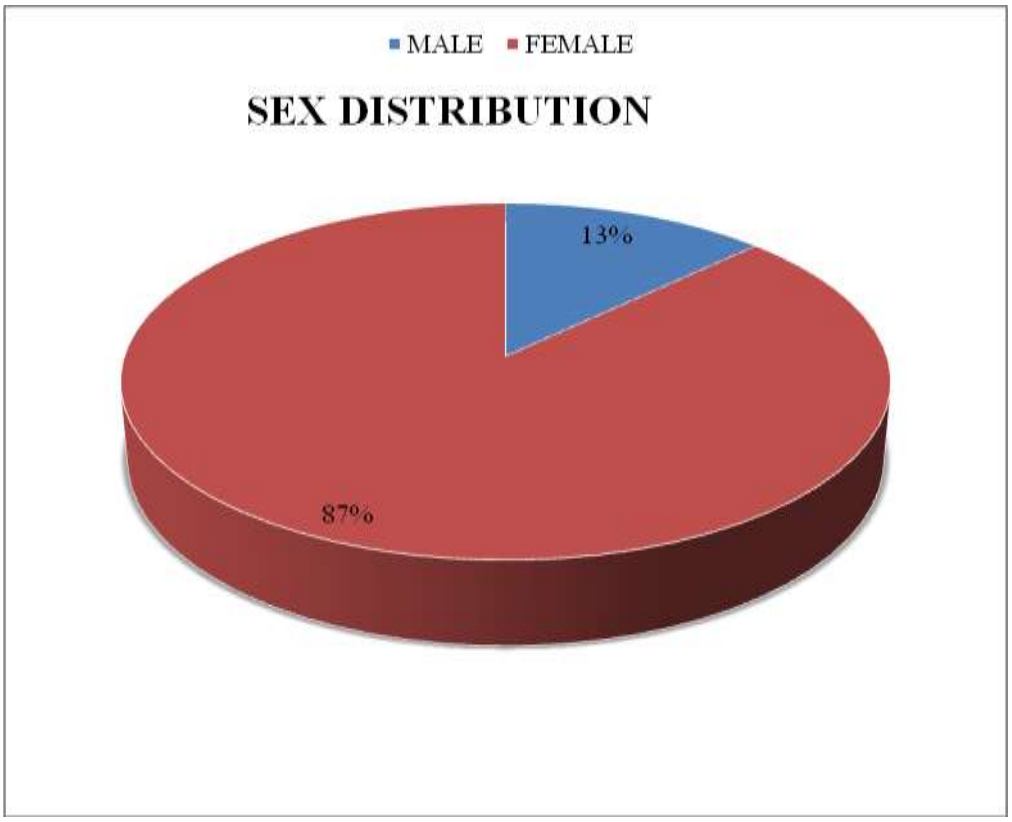
Of the 86 cases, 46cases were with <25.this shows, obesity does not influence incision hernia occurrence.



PRESENTING SYMPTOMS: Almost all cases had swelling to present with, but presentation as swelling was in51cases,**pain in 25cases,both in 10cases.**



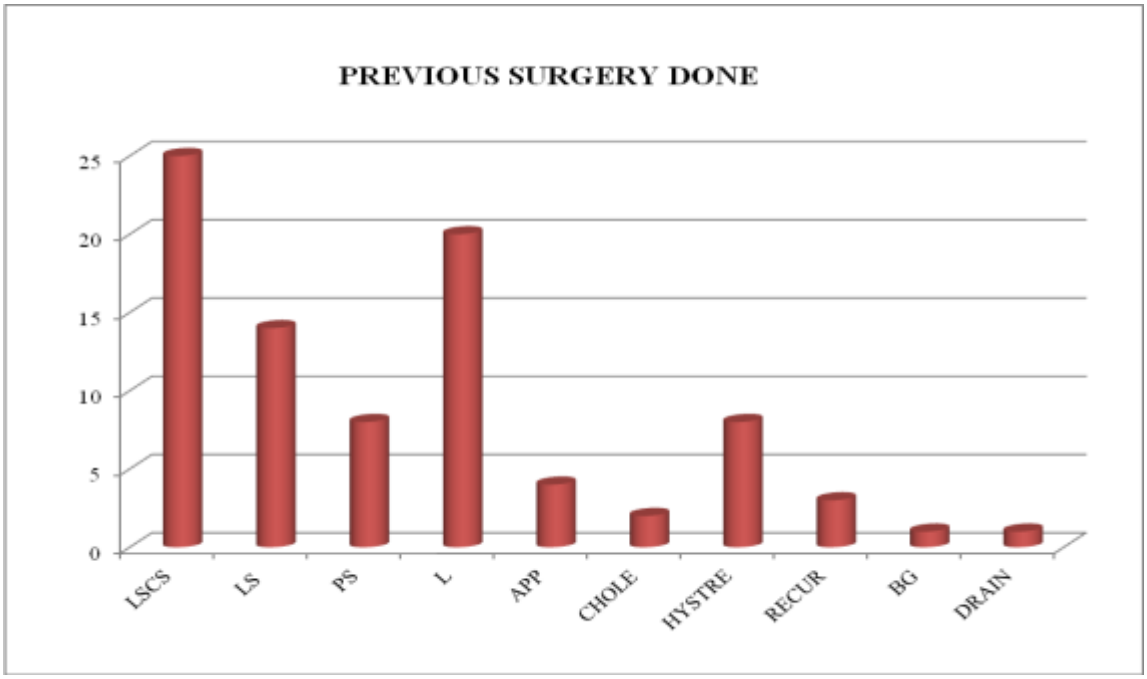
SEX DISTRIBUTION:



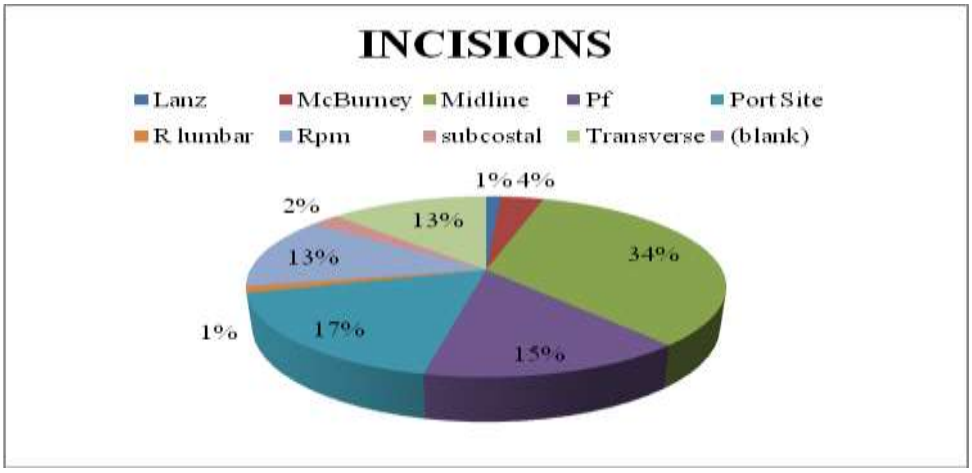
Of the 86 CASES, 11 WERE MALES AND 75 WERE FEMALE, SHOWING FEMALE PREPONDERANCE it may be attributed to the frequency of obstretic and gynaec surgeries common in this age group.

PREVIOUS SURGERY

Of the 86 cases,25 was caesarean section(29%),14 was lap sterilization (16.3%),8 was puerperal sterilization(9.3%),8 was hysterectomy(9.3%)20 was laparotomies(23.2%), 4 was appendicectomy (4.6%),2 cholecystectomy(2.3%), 1 was bone graft from iliac crest(1.2%),1 was at Rt lumbar drain site(1.2%),3 were recurrent incisional hernia(3.4%).

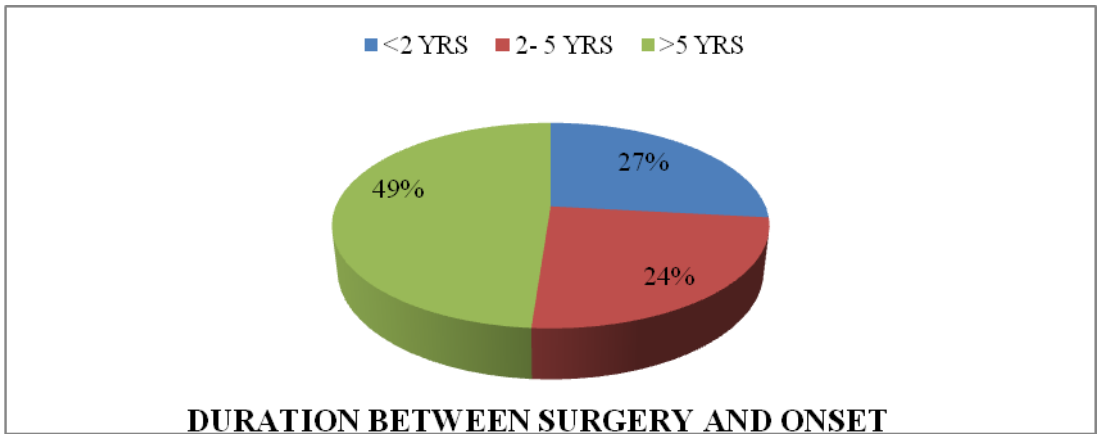


INCISION OF PREVIOUS SURGERY: IN gynec surgeries lower midline incision was predominantly used (23.2%) followed by Pfansteill incision (15%) and lower transverse incision.in appendicectomy cases Mcburney incision,. in cholecystectomy subcostal incision.in laproscopic sterilization port site



Midline Incision	**29**
RPM	**11**
Pfannensteil	**13**
Tranverse	**12**
Mcburneys	**3**
Lanz	**1**
Subcostal	**2**
Portsite	**14**
Right Lumbar	**1**

TIME OF ONSET:Of 86 cases,42cases had onset after 5yrs of surgery(48.8%),21 it between 2 and 5yrs(24.4%),23 cases developed within 2yrs of surgery.



DURATION BETWEEN SURGERY AND ONSET

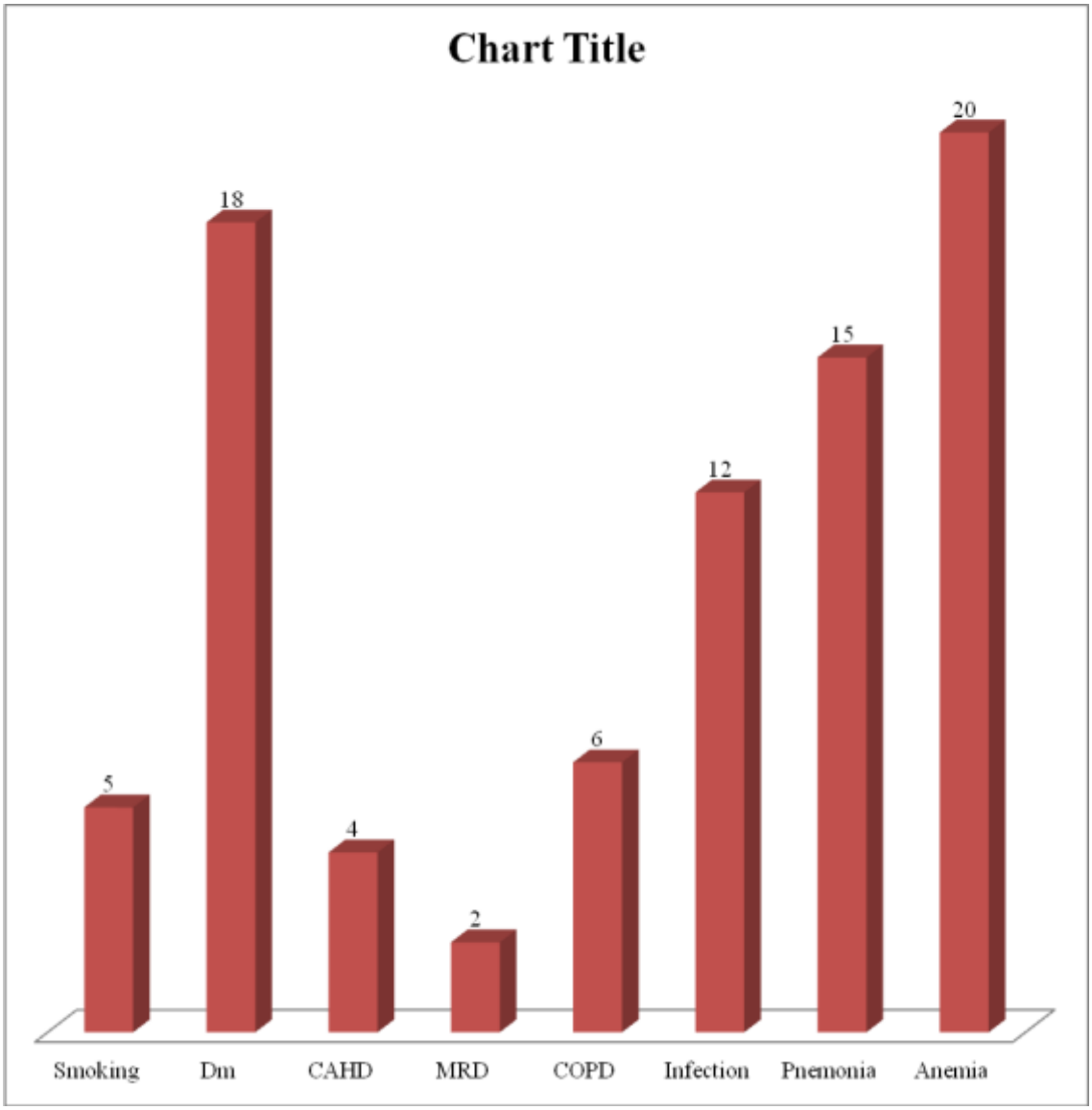
<2yrs	**23**	**26.8%**
2-5yrs	**21**	**24.4%**
>5yrs	**42**	**48.8%**

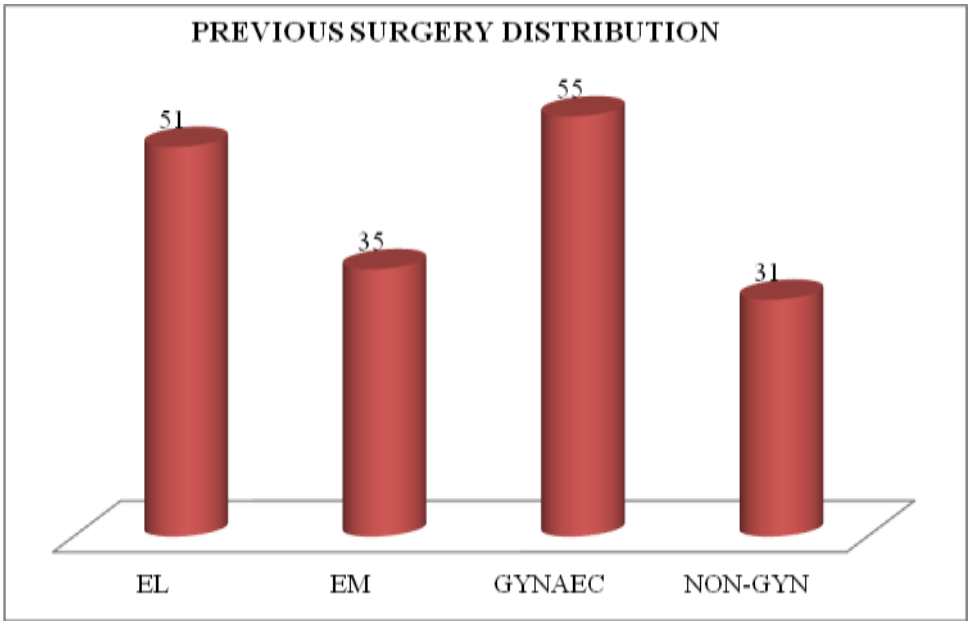
SIZE OF DEFECT:OF 86 Cases,22 cases had large defects of over 6cm diameter(26%),24 had small defect of less than 3cm(28%),40 cases had average defect of 3-6cm(46%).

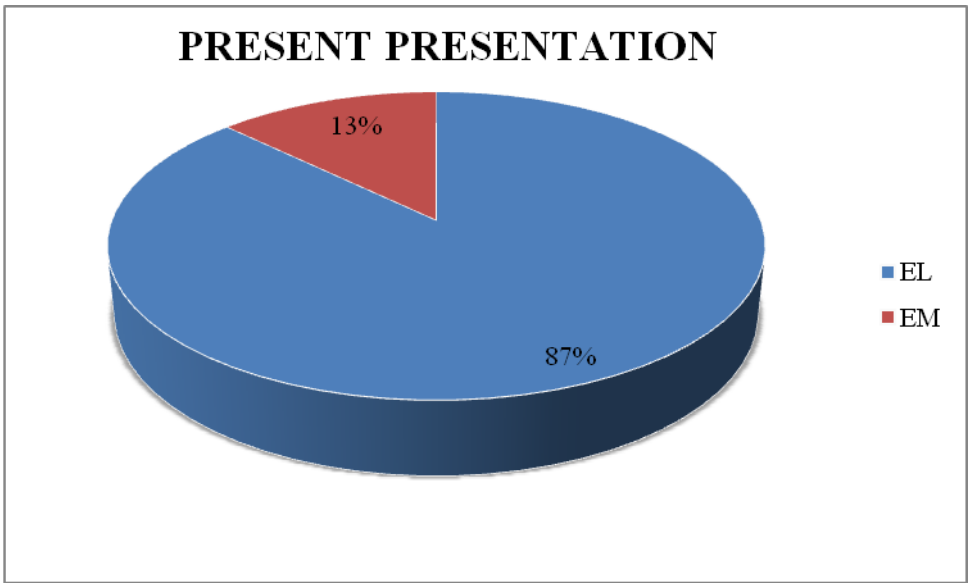
PREDISPOSING FACTORS:

Most common risk factor associated are diabetes,anaemia,infection,pneumonia in post.op period

RISK FACTORS

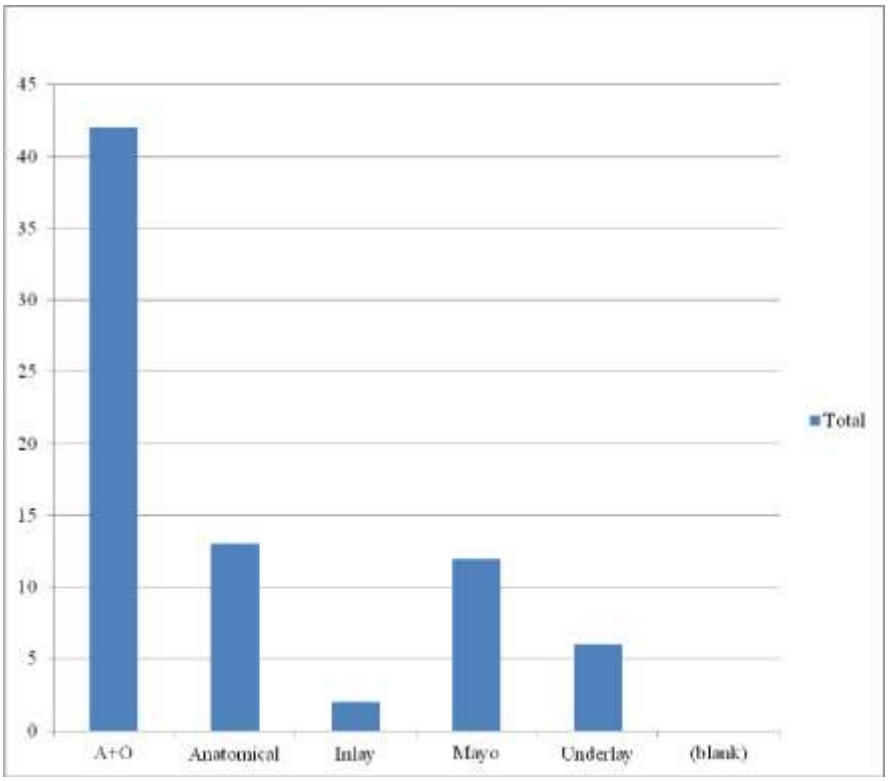




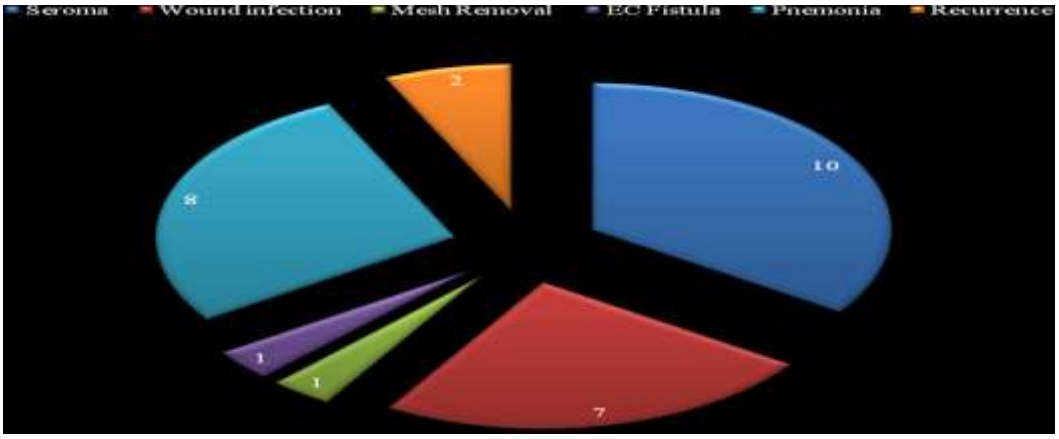


Elective cases	**76**
Emergency	**10 (Irreducible-6,Obstruction-4)**

SURGERY PERFORMED



Hernias with small defects were repaired by anatomical repair. some were treated by double breasting reinforced by mesh(A+O).hernias with larger defect were treated by mesh repair mostly by onlay.

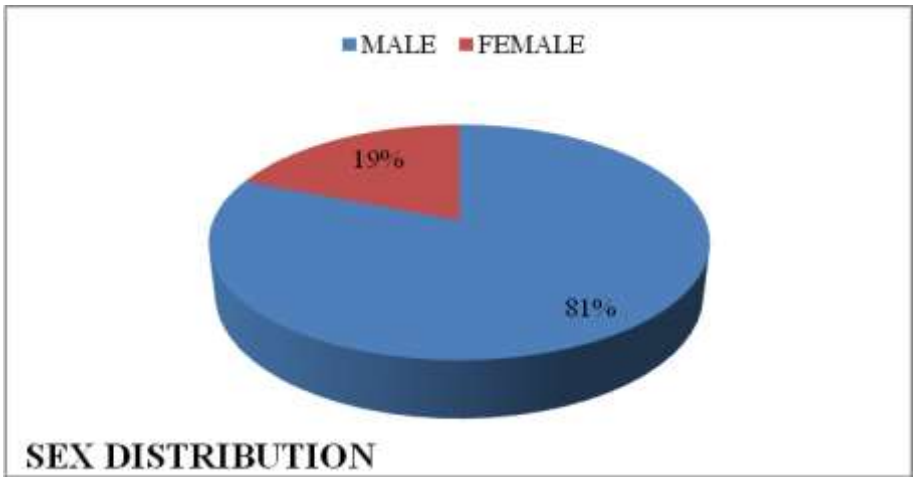


COMPLICATION

Complications	Number	Percentage
Seroma	10	35
Wound Infection	7	24
Mesh Removal	1	3
Enterocutaneous Fistula	1	3
Pulmonary Complication	8	28
Recurrence	2	6

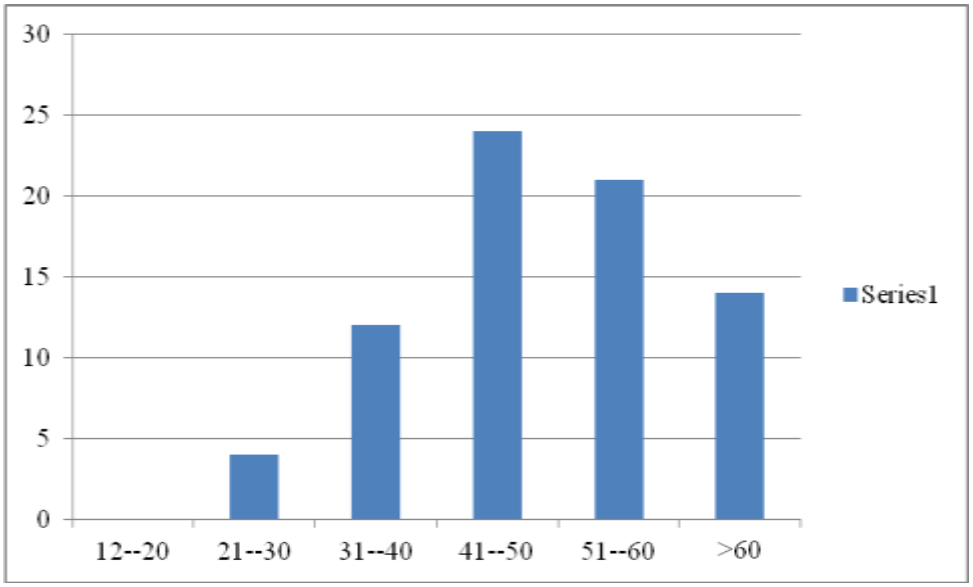
ANALYSIS OF EPIGASTRIC HERNIA

Sex distribution:



OF THE 21 CASES,17 were MALE(81%),female were 4(19%).

MALE :FEMALE – 4:1

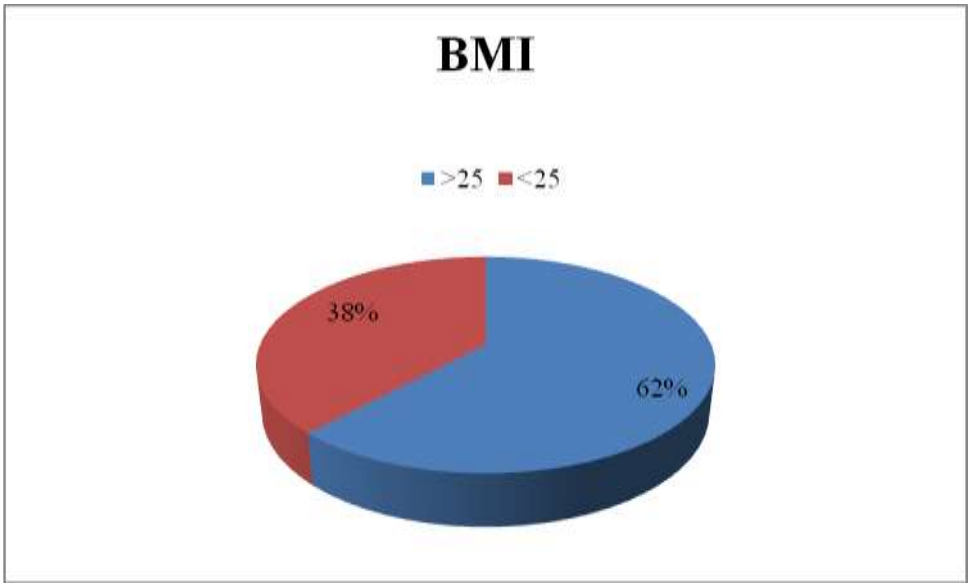


AGE DISTRDISTRIBUTION

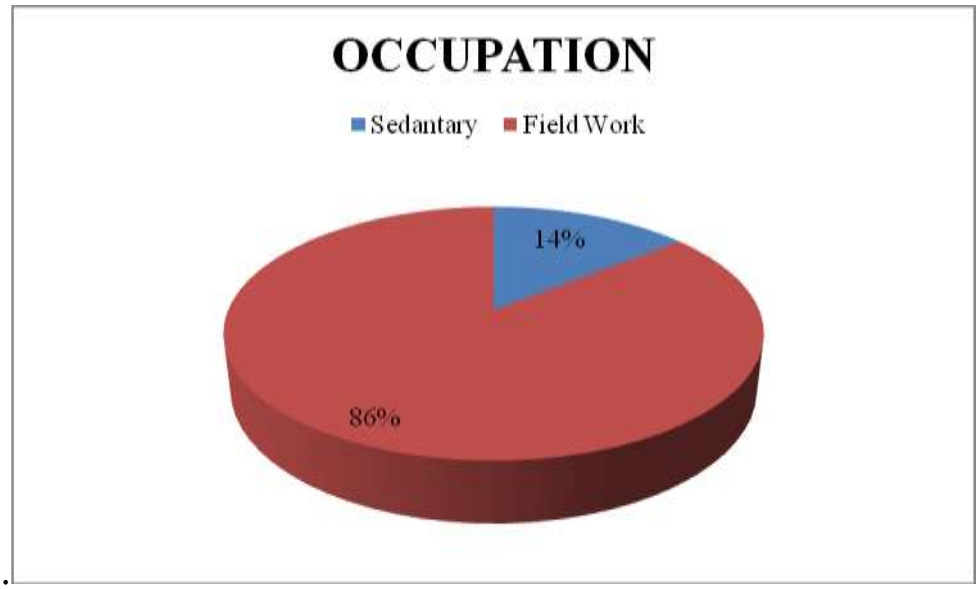
BODYMASS INDEX

BMI <25% - 8 CASES - 38%

BMI>25% -13 CASES -62%



OCCUPATION: Heavy workers are commonly affected, may be the muscular strain causes rupture of muscle fibers causing weakening and incision hernia



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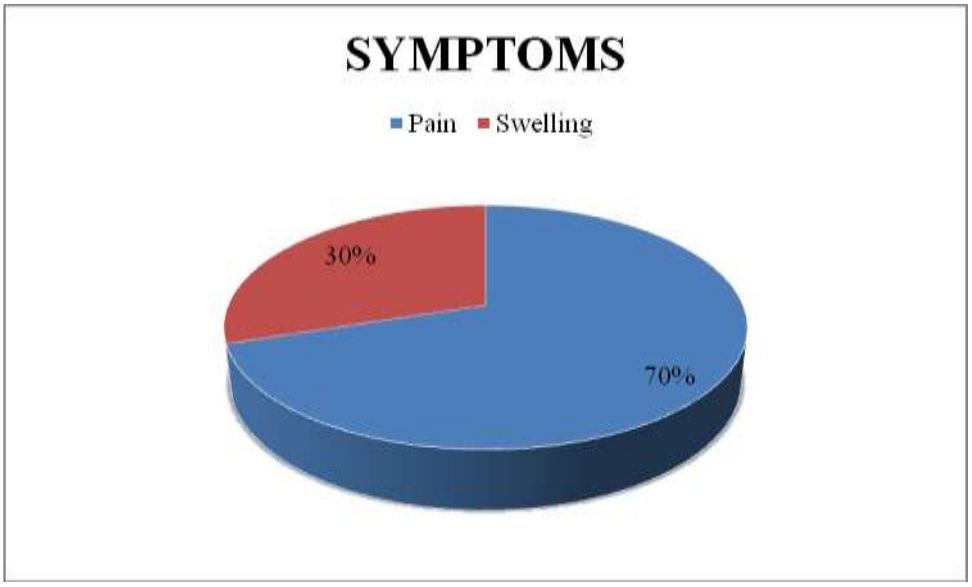
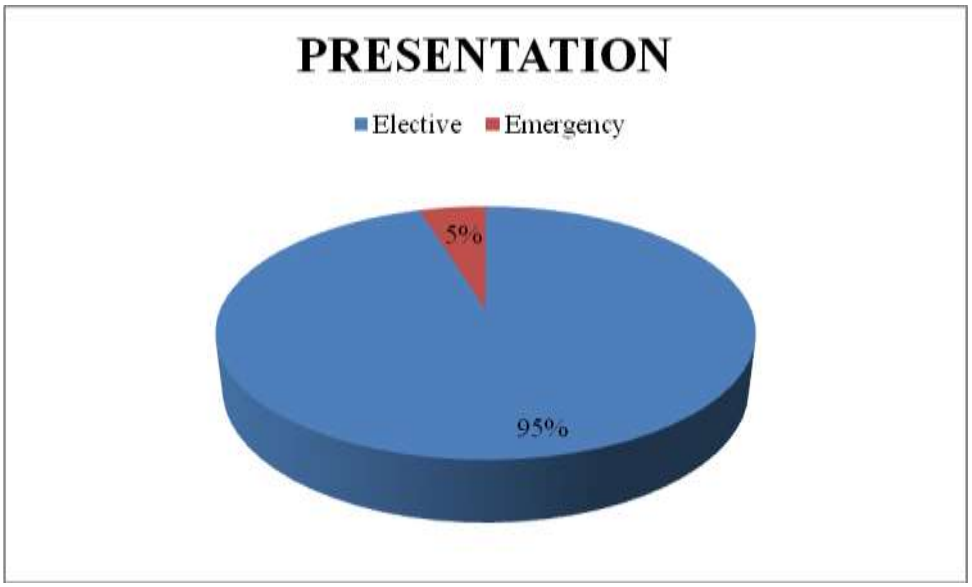
PRESENTING SYMPTOMS- All the cases had swelling but the presenting symptom was found only in 6 cases.(34%)Major presentation was pain in epigastric region 14 cases(66%)



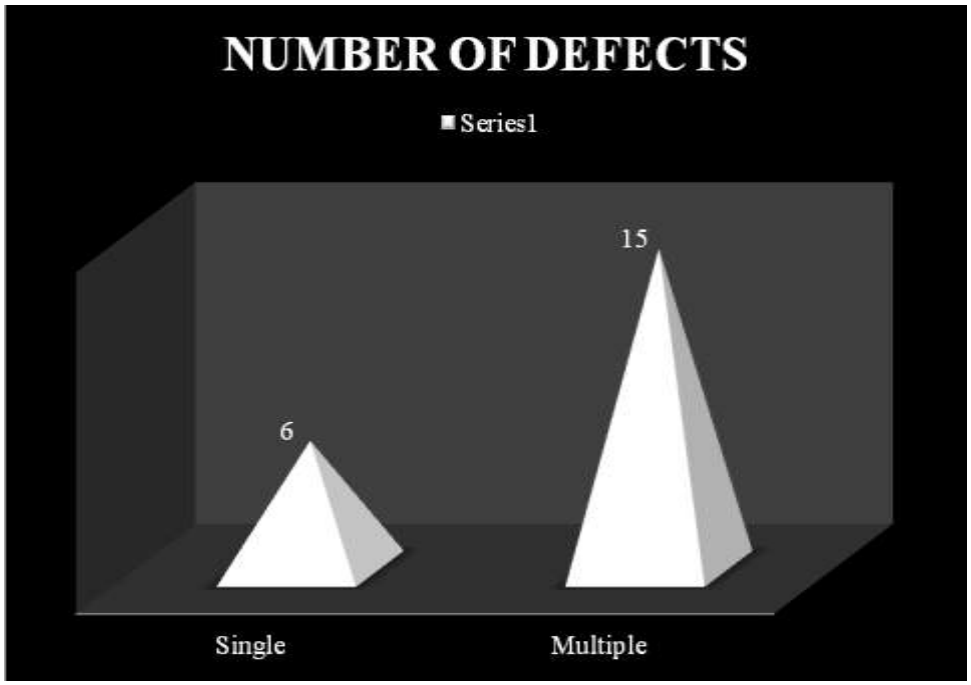
PRESENTATION:

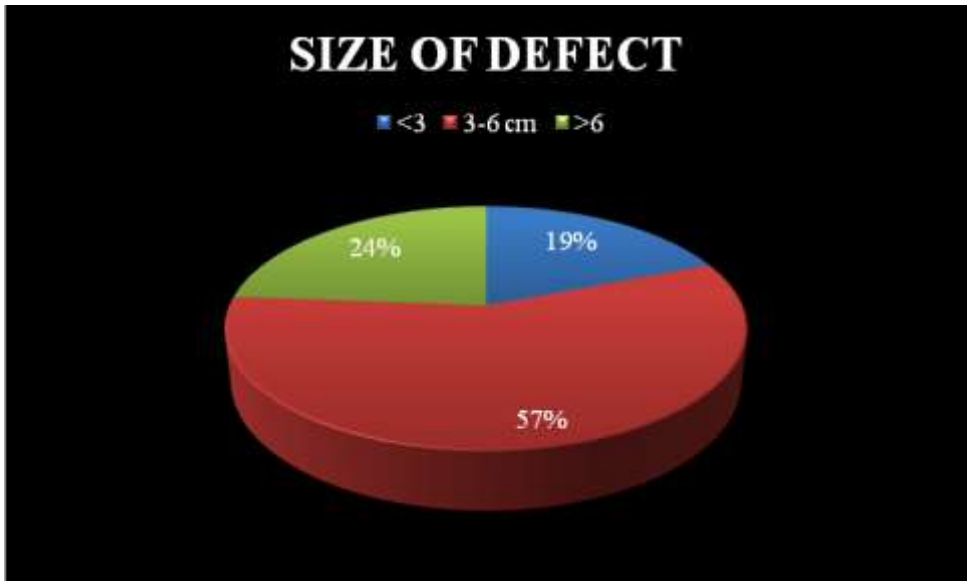
Most of the cases were electively treated but for one case that was taken up for irreducibility as emergency.



Size and Number of defects:

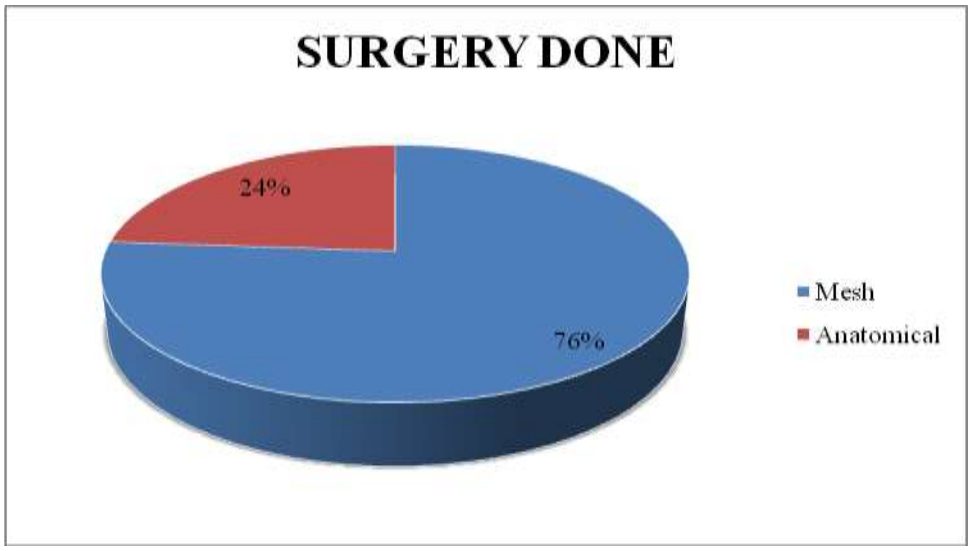
most epigastric hernias are found to have multiple defects along the linea alba 15 cases (71.4%), only 6 cases had single defect. Most of the cases were with defect 3-6cm (57%),>6cm (5%),<3cm (4%).





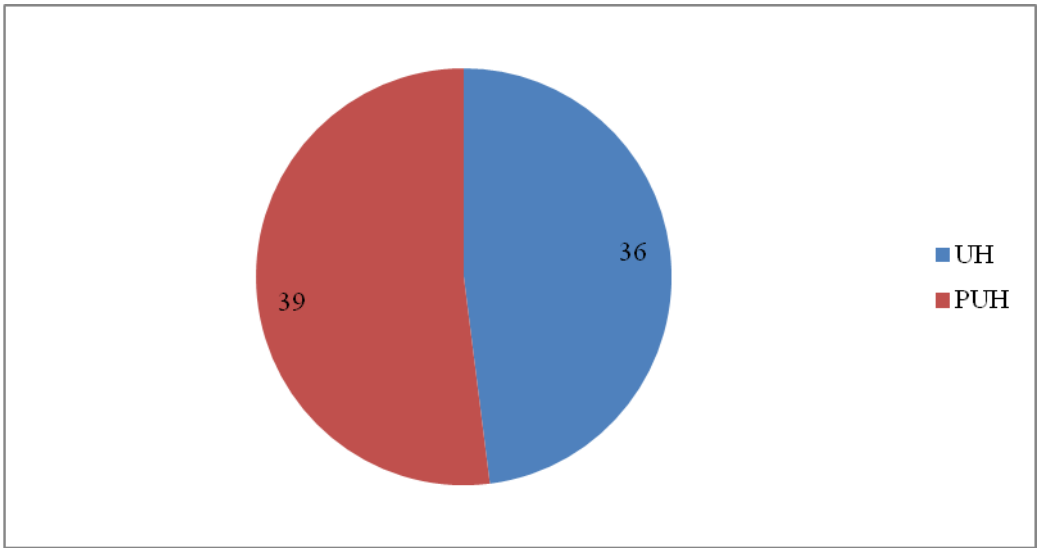
SURGICAL REPAIR:

Of the 21 cases, 5 cases were anatomically repaired (23.8%), others were repaired by meshplasty.

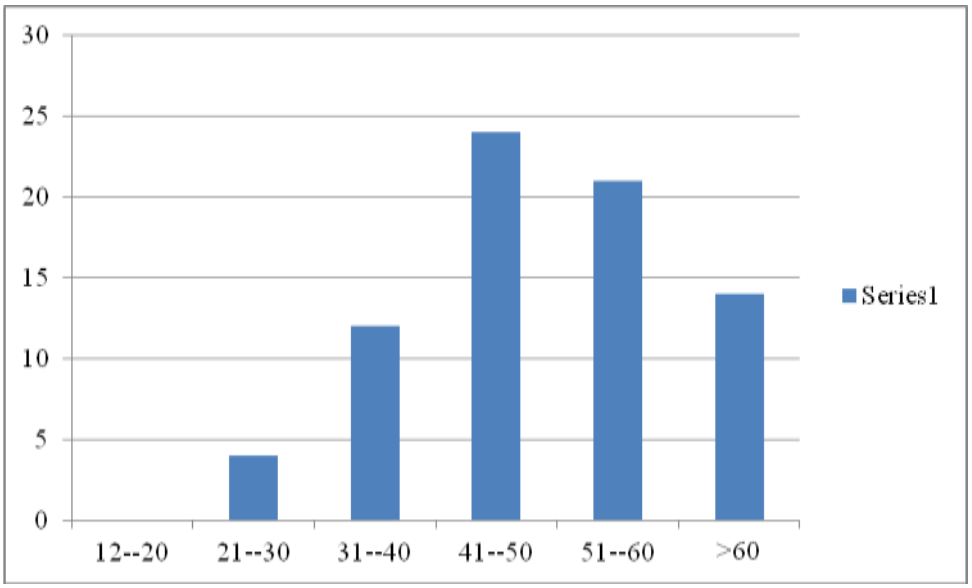


ANALYSIS OF UMBILICAL HERNIAS:

Type of hernia- Of the 75 cases pure umbilical swelling was present in 36 cases (48)

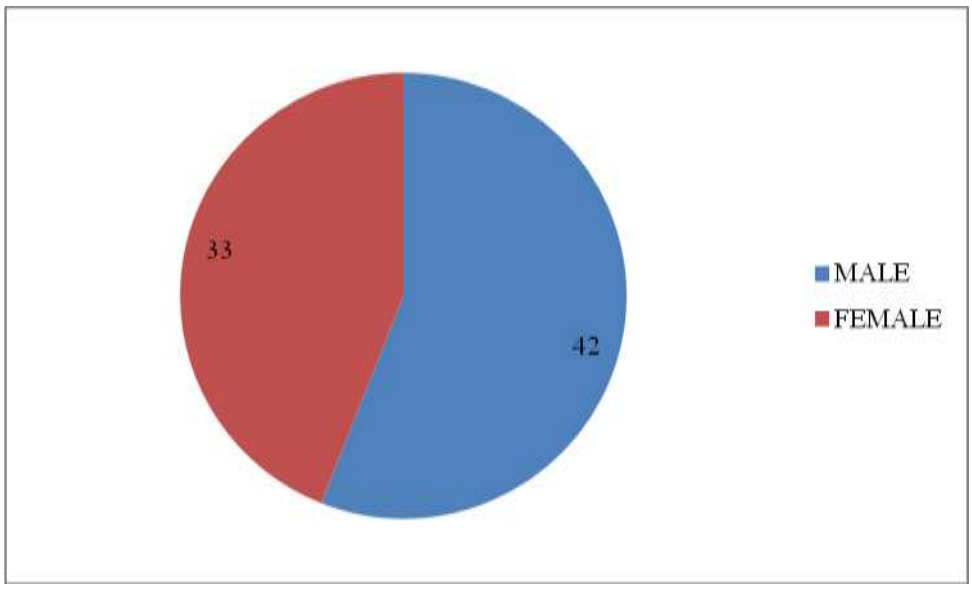


AGE DISTRIBUTION: mostly in the fourth decade.

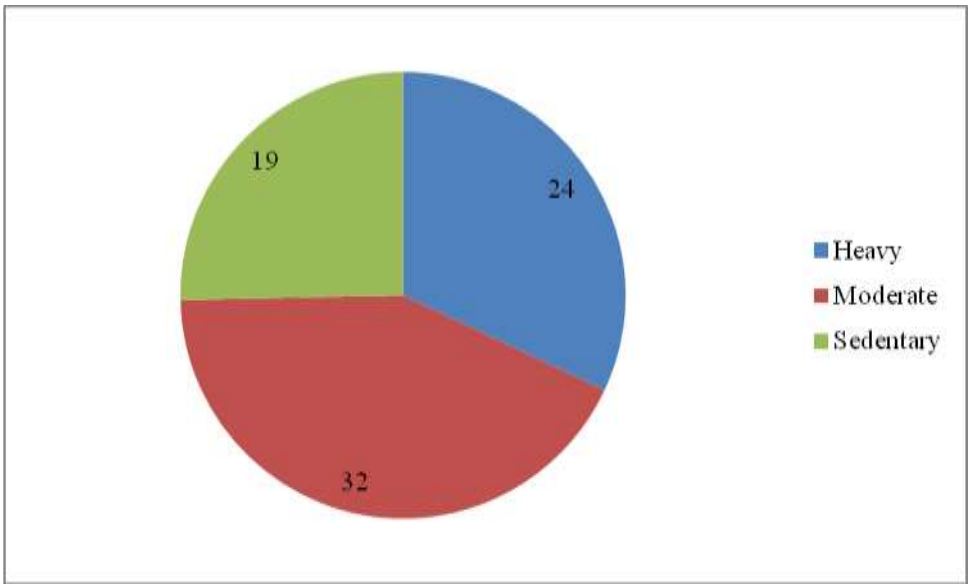


SEX DISTRIBUTION: more common in female 33 cases (44%), males 42(56%).

MALE:FEMALE = 1.2:1



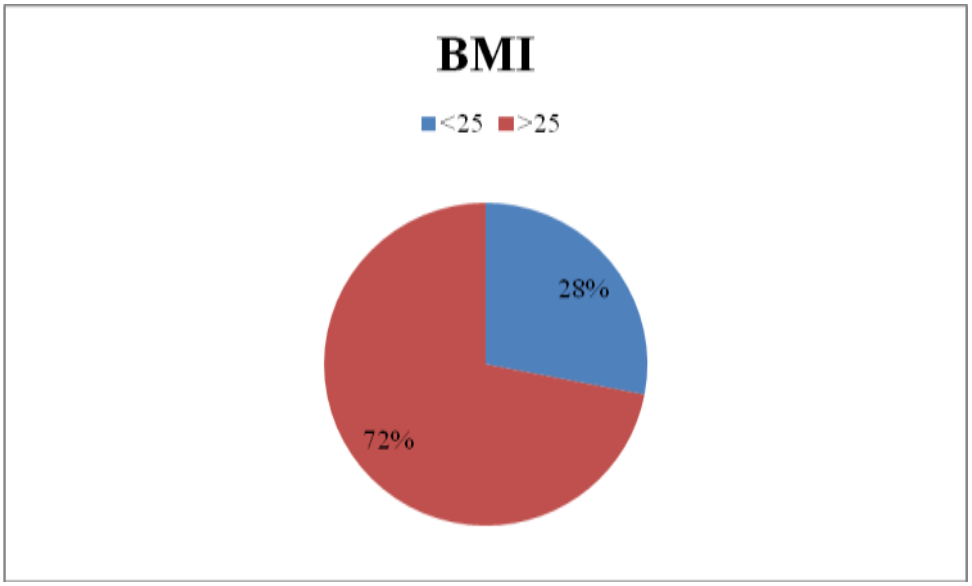
OCCUPATION: It does not influence the umbilical hernia occurrence.



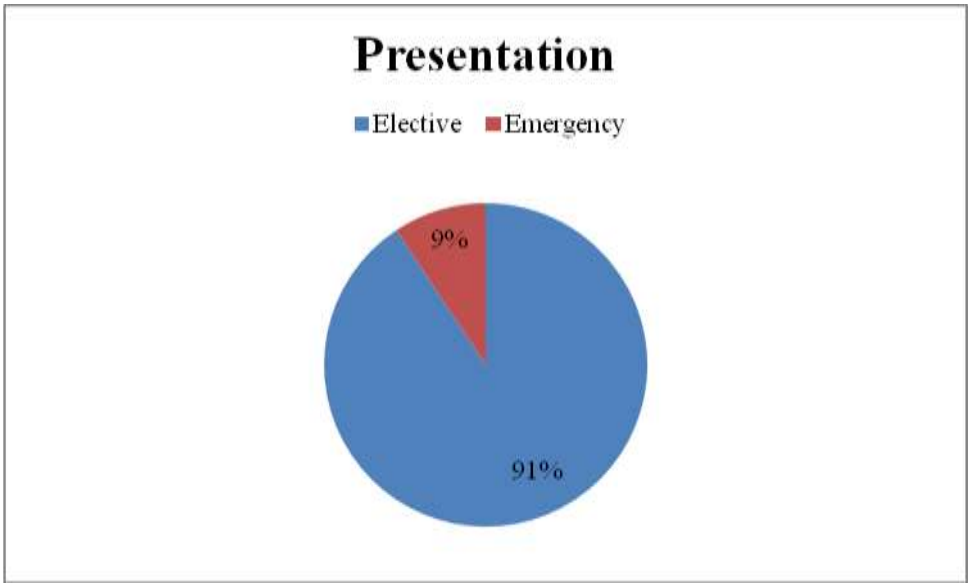
BODYMASS INDEX: common in obese.

Body Mass Index>25 – 55cases (72%)

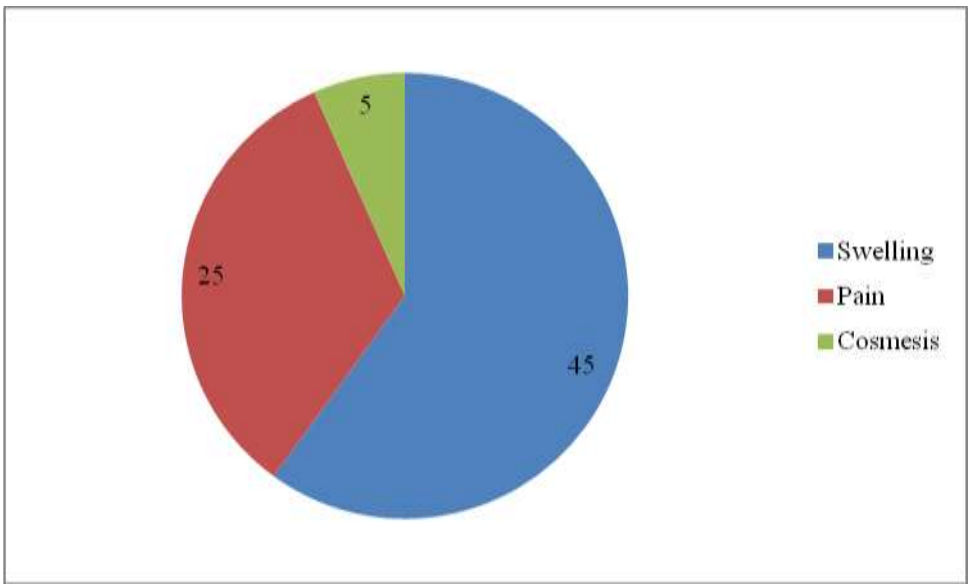
Body Mass Index<25 – 20cases (28%)



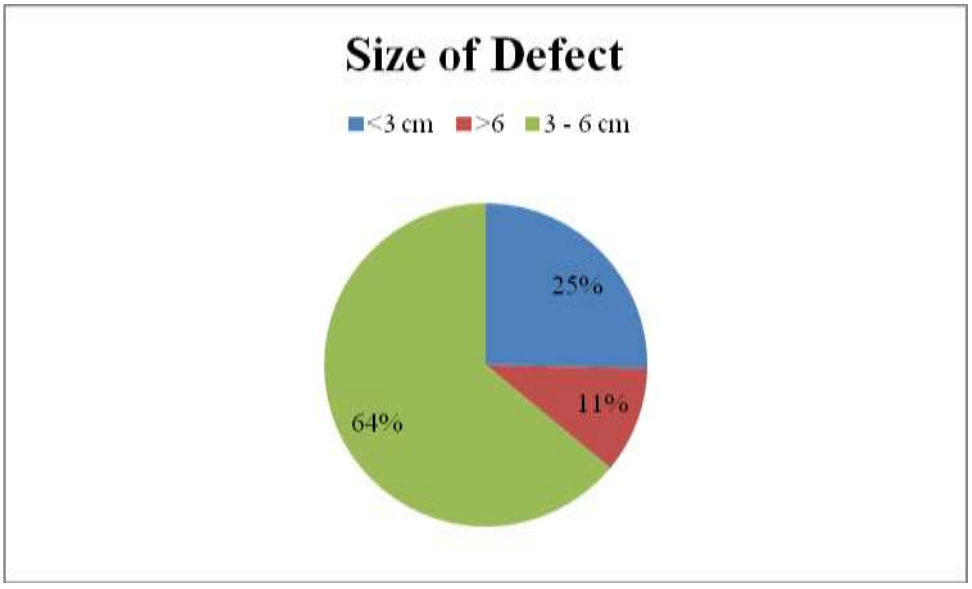
Umbilical Hernia – Mostly presented for elective surgical repair, Of the 75 cases 7 cases were taken up for emergency surgery(5-irreducible,2-obstruction)



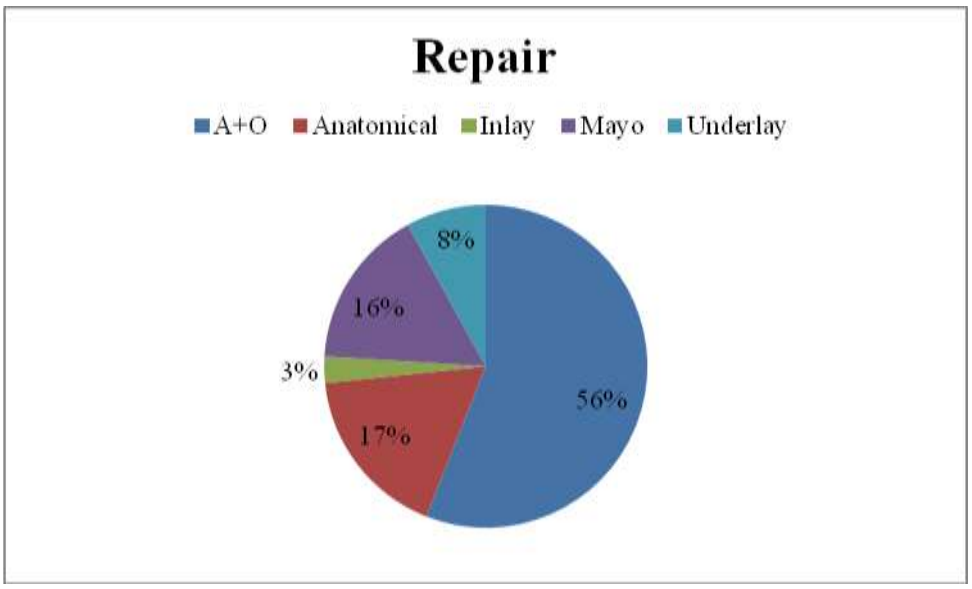
PRESENTING SYMPTOM – All patients had swelling of which only 45cases had it as a presenting complaint (66%),pain was the next presenting complaint in 25cases (33.3%),5 other patients came for cosmetic surgery.



SIZE OF DEFECT: there were defects of 3-6cm size in most patients.42cases, <3cm in 25 cases,>6cm in 8 cases.



SURGERY DONE – Of the 75 cases, 13cases were given anatomical repair(17.3%),Mayo's repair was done in 12 cases(16%),rest were given mesh repair



SPIGELIAN HERNIA: One case of 35yr female presented with pain abdomen 1yr duration, swelling for 1week, diagnosed clinically as spigelian hernia.USG showed defect in Lt Side of umbilicus of 5*3cm.

Treated by mesh repair.

LUMBAR HERNIA: 2 cases - males of age 35, 46 presented with swelling lumbar area in the superior triangle.

Treated by mesh repair.

DISCUSSION

VENTRAL HERNIAS: incidence is second only to inguinal hernias, accounting for 25-35 % of all hernias. Ventral hernias include Incisional and primary defects in the abdominal fascia, which can cause umbilical, epigastric, or spigelian hernias. Incisional hernias account for 80% or more of ventral hernias that surgeons repair. The prevalence of Incisional hernias after Laparotomy is 2% to 11%and increases substantially when certain risk factors for postoperative Incisional hernia, such as a wound infection or obesity, in our study,Incisional hernias accounted for 46.4% of ventral hernias. 40.5%were umbilical hernia, 11.4% were epigastric hernias.

INCIDENCE OF ABDOMINAL HERNIAS:

TYPE	**PRESENT STUDY**		**BOSE SERIES**	
	NO	**%**	**NO**	**%**
IH	86	46.49	110	62.86
EH	21	11.35	21	12.00
UH	36	19.46	12	6.86
PUH	39	21.08	32	18.29
SH	1	0.54	0	0.00
LH	2	1.08	0	0.00
TOTAL	**185**		**175**	

Age and sex study

In our study,Incisional hernias sex ratio was M:F= 6.7:1 (75 female patients, (87%) and 11 males (13%)). Ellis H. et.al. have obtained 64.6% female population in their study of 342 patients. This female preponderance of Incisional hernias could be due to relatively high frequency of employing lower midline incisions notoriously prone for herniation in women who undergo surgery for pelvic organ pathology.

With respect to umbilical and epigastric hernias male preponderance was seen Epigastric hernia 17 male (81%),4 female (19%) ,umbilical hernia 42 male (56 %),33 female (44%) respectively making a ratio of 4:1 and 1.2:1 respectively.

Affected patients typically presented in their 3, 4, 5, decades. Varied Opinions on the importance of patient's age in predisposing to post operative herniation was given by Kozoll 1964; Lindner; 1975; Thorlakson, 1965: Vilvanto and Vanttinen,1968. Carlson found no significant risk for the elderly or male patients in his study. Robert J Baker reports considerably increased incidence in old age due to tissues senescence.

PREVIOUS SURGERY :

Majority of the patients who underwent gynecological procedures (64%) namely puerperal tubectomy – 9.3%, LSCS - 29%, hysterectomy – 9.3% developed incision hernia through lower midline incisions.23% of the patients who underwent Laparotomy for perforation peritonitis developed Incisional hernia16.3% had developed port site hernia (laproscopic sterilization)

Toms P.A et al. says midline incision through the relatively avascular linea alba contributes more than transverse incision, especially where muscle splitting

approaches are been used. Carlson found a 10.5% ventral hernia rate in 4129 midline incisions compared with a 7.5% rate for transverse incision and a 2.5% rate of paramedian incision. As many as 20% of patients who underwent Laparotomy develop Incisional hernia (Roland et al. and Luijendijk et al.) .

Rios A et al. has given the percentages of various incisions through which hernia has occurred as shown in table below.

INCISIONS	PRESENT STUDY		BOSE SERIES		RIOS	BALEN
	NO	%	NO	%	%	%
VERTICAL	40	46.5	91	82.72		
IU	20	23.2	35	38.46	36	9.1
SU	20	23.2	0	0	16	20.6
TRANSVERSE	14	16.27	0	0		6.89
MCBURNEY	3	3.4	19	10.86		2.29
SUBCOSTAL	2	2.3	0	0	6	2.29
PFFANENSTEIL	13	15				2.29

Korenkov et al., says that Incisional hernia can occur after all types of abdominal surgery and the risk lies between 11 % and 15% after midline Laparotomy and 0.2% to 1.2 % after laparoscopy.

Time of onset of hernia following previous surgery

In our study 26.8% developed in <2 yr and 24.4% between 2 to 5 yrs, 48.8% after 5 years. Vilvanto and Vanttinen, 1968 said Incisional hernia usually develop within 1year of operation and rarely after 2 – 3 yrs. Jack Abrahamson has said that about 2/3 appear within first 5 yrs and at least another 1/3 appear 5 10 yrs after operation. Hernias may appear even after more than 10 yrs. In 10 yrs

prospective trial involving 537 patients Mudge and Hughes showed that of the 62 patients who developed Incisional hernia, 56 % did so within 1 post operative year and 35% after 5 yrs. More than half of all Incisional hernias present within first 2 yrs of primary surgery, but significant percentage of them can occur many years after primary operation (Keith W. Millicon) .

Modes of presentation:

In our study swelling was the most common complaint (59.3%, 51 patients) followed by pain (29%, i.e. 25 patients); lastly swelling+ pain (12%, i.e. 10 patients). Muschaweck mentioned that it may be impossible to clinically distinguish between hernia mass from a subcutaneous lipoma, fibroma, however USG and or CT may be used to verify the diagnosis, especially in obese patients. Most of the ventral hernias were uncomplicated at the time of presentation. In our study on incisional hernia 88% were uncomplicated (75 cases), 6.9% i.e. 6 cases presented with irreducibility, 4.6% i.e. 4 case with obstruction.

Santora A .T and Rosylin J.J have stated that Incisional hernia manifest as a bulge in the abdominal wall closure scar..

COMPLAINTS	**PRESENT STUDY**		**BOSE SERIES**
	NO	**%**	**%**
Swelling	102	55.14	100
Pain	58	31.35	24
Irreducibility	8	4.32	18.85
Obstruction	6	3.24	7.4
TOTAL	**185**		

K. Cassar and A. Munro observed incisional hernia as a bulge visible and palpable swelling when the patient is standing and often requiring support or repair. Toms P.A et al. said that abdominal wall hernias may be asymptomatic or present with life threatening emergency.

Incisional hernia presents with pain, complications such as incarceration (6-15%) or strangulation of bowel (2%) (Riet M. et al. 2002).usually an asymptomatic bulge noticed by the patient or a bulge directly over the incision or in an adjacent area locally related to the incision is the presentation.(Millikan K.W, 2003) .

Jack Abrahamson defines as unsightly bulge in the operation scar as well as pain and discomfort. Robert J Baker says--A bulge in the vicinity of the healed scar. Rupture of large incisional hernias is uncommon but is encountered occasionally (Hamilton, 1966) Patients experience pain and vague discomfort if omentum or preperitoneal fat herniates through a small defect.

Associated risk factors and illness

The major cause of postoperative herniation is wound infection as leads to fascial necrosis with resultant loss of integrity of the closure (Bucknal et, al 1992) .

Early wound failure in more than 50% of the postoperative hernias is due to sepsis causing hernia within one year of operation (Jack Abrahamson) .Approximately 35 to 40% of Incisional hernias occur with a documented history of wound infection but reported incidence of hernia treated wound infection varies from 5 to 20% (Robert J, Baker) . there is a fivefold increase in the risk of development of hernia in infected wounds(23%) compared with patients with uninfected wounds (4.5%). Blomstedt and Welin Berger 1972, reports similarly

Incisional hernias occur in 23% of those who develop post operative

wound infection (K Cassar and A Munro 2002). Both Carlson and Makela did not find local infection as a predisposing factor for the development of Incisional hernia. In our study 12 patients in mesh repair group had wound infection.

Anemia, diabetes mellitus, obesity, alcoholism, smoking have been associated with high percentage of post operative hernias (Jack Abraham).In our study-- 20 patients were anemic (23.2%), 18 were diabetic (20.9%), 40 was obese, (46.5%) were smokers (5%). Ellis group (1982) found that obesity was associated with 3 fold increase in herniation and recurrence. 19.9% were diabetic, 9.3% were obese and 3.7% were immune suppressed as quoted by Rios A et al. (2001)

.obesity has been cited as a risk factor for acute fascial dehiscence and Incisional hernia after major abdominal operations (Millikan K W, 2003). Obesity was not found to be an independent risk factor for Incisional hernia by Makela (1995).pulmonary complications causing cough &straining increase hernia incidence due to decreased wound tensile strength and integrity. . In our study 15patients (6.9%) had Post operative pulmonary complications / Common etiological factors responsible for recurrence after Incisional hernia repair are postoperative wound sepsis , suturing under tension, persistent post operative distention, missed defects of fascia not taken into repair (false recurrence) (Matapurkar,G,B et,al 1995)

Operative Procedures

In our study 42 patients i.e. 48.8% underwent suture repair (simple suturing & double breasting) and 44 patients i.e. 51.2% underwent mesh repair. In a retrospective study of 206 patients undergoing repair, Read and Younger reported that the indication for repair in 17% of all the patients was management of incarceration or strangulation.

There were 6 cases of irreducibility (6.9%) and 4 case of obstruction (4.6%) which was the indication for emergency surgery(12%) in our study . The results are comparable to trial in which suture repair and mesh repair were compared by Lujendijk,W.R et,al 2000 .

REPAIR	PRESENT STUDY		BOSE SERIES	
	NO	%	NO	%
ANATOMICAL	24	27.9	97	55.4
DOUBLEBREASTING & OVERLAYMESH	18	20.9	21	12
ANATOMICAL ONLAY	39	45.3	45	25.7
INLAY	2	2.3	0	0
UNDER LAY	3	3.4	12	6.8

In suture repairs ,when there is excess tension, tissue ischemia causes cutting thro of suturesand wound dehiscence. With prosthetic mesh defects of any size can be repaired without tension. polypropelene mesh causes inflammatory response that sets up scaffolding that in turn induces the synthesis of collagen (Rebecca Knight, Michael E. Fenoglio, 2002)

Choice of mesh:

Select a light-weight mesh, monofilament ,with large pores and minimal surface area. A polypropylene or polyester mesh is, therefore, usually suitable (for example. Paritiem Light. Optilene, Mersilene). These meshes will be more comfortable and have a lower risk of infection.for placing inside the peritoneal cavity, an attempt should be made to minimise adhesions by choosing a hybrid mesh with an absorbable surface. In infected wounds, an absorbable mesh is preferred, for example, polyglactin (Vicryl) or polyglycolic (Dexon). Biomaterials may also the useful ,but costlier. too. If a mesh is too small or fixed under tension, there will be complications whatever its material

Defect size

The size of the fascial defect and the appearance of fascia should dictate the selection of the most appropriate method of hernia repair (Santora and Roslyn, 1993). In the present study <3cm ,24 cases (27.9), with 3-6cm defect 40 cases (46.5%), 22 patients had defect size >6cm—(23.6%)**s**

INCISIONAL HERNIA COMPLICATIONS

In the present study seroma in **10**cases, infection in **7** cases, enterocutaneous fistula in one case.2 cases of recurrences - Due to mesh extrusion one case and other due in chronic renal failure patient. In Balen et al study, 4% seroma, 4% ileus, 2% fistula. In Tamundam et al study,6%seroma,16%ileus,2%pain,14% others. There was no mortality in our study. In a review of 3107 Incisional hernia repairs, Heydon and Velanovich reported that the mortality rate was appreciably higher in patients undergoing repair of complicated hernias (1.1%) than in those individuals undergoing elective repair.(o.3%).

S.no	Reference year	Type of repair	No of pt	Recurrence %	Follow up in months
1	Liakakos et al 1994	Suture mesh	53 49	25 8	90 90
2.	Schumpelik et al 1996	Suture Mesh	190 7	33 7	64 64
3.	Clark 2001	Suture Mesh	13 8	38 25	25 13
4.	Luijendijik et al 2000	Suture Mesh	97 84	46 23	26 26
5.	Korenkov et al 2002	Suture Mesh	33 39	12.12 7.69	16 16
6.	Our study	Suture mesh	24 62	.01 .01	6-18 6-18

CONCLUSIONS

85 cases of ventral hernias were studied with follow up a period of 6 to 18 months

- Incisional hernias constituted 46.4% of all ventral hernias, epigastric 11.4%,umbilical hernia 40.5%,spigelian(.005%),and lumbar (.01%).
- Female preponderance was seen in Incisional hernias with male to female ratio of 6.7:1, where as in epigastric and umbilical/Para umbilical hernias male predominance was seen with ratio of 4:1 and 1.2:1 respectively.
- Most of the ventral hernias 88.7% were uncomplicated at the time of presentation, remaining 9.7 % presented with either obstruction or irreducibility, necessitating emergency repair.
- Swelling was the most common complaint in 55%, followed by pain 31.6.
- Previous surgery or trauma was the single most important cause for ventral (Incisional) hernias. Other etiological factors were multiparity, obesity, anemia, COPD, BPH, diabetes mellitus alcoholism and smocking.
- Post operative wound infection was important cause for development of incisional hernias.
- Rare hernias viz, spigelian1case, lumbar 2cases were seen during our study period.
- Simple suture repair and or Mayo's repair was the choice of repair in children and in emergencies in all age groups. It was done for all verities of ventral hernias with smaller defect size.
- Mesh repair is the technique of choice for most of Incisional hernias and or all ventral hernias with large defect. Though sub lay/underlay mesh placement is more physiological, it can be placed either inlay or on lay.
- Laparoscopic approach for ventral hernia repair is definitely method of choice with the advantages of good operative field visibility, lessened

duration of hospital stay, minimal post operative scar. Cost of surgery and surgical expertise being the limiting factors for our study.

- Mesh repair can be combined with elective bowel surgeries provided careful pre operative preparation of the patient, meticulous dissection, complete haemostasis, and proper post operative care is given. This still needs further studies.
- Prolene hernia system was primarily developed for repair of inguinal hernias, now a days this novel technique is being increasingly employed for the management of epigastric and umbilical hernias also.
- Size of the defect and presence of complication are the guiding factors for choosing the type of repair.

SUMMARY

Between the period of January 2011 to September 2012, 185 cases of ventral hernias treated at TVMCH were studied and followed for a period of 6 to 18 months. Ventral hernias were common surgical problems second only to groin hernias. More than 45% of ventral hernias were Incisional followed by, umbilical, paraumbilical hernias and epigastric hernias.. Most of the Incisional hernias developed >5yrs of previous surgery. Swelling, pain and complications along with aesthetic concerns are the causes for seeking surgical solution .Most of ventral hernias were uncomplicated at the time of presentation, remaining presented with either obstruction or strangulation necessitating emergency repair.

Incidence of Incisional hernias was more in females with male to female ratio of 6.7:1, while epigastric and umbilical hernias were more common in males with male to female ratio of 4:1 and 1.2:1 respectively. Previous surgery was the single most important cause for ventral (Incisional) hernias. Other etiological factors were multiparity, obesity, anemia, COPD, BPH, diabetes mellitus, alcoholism and smoking. Post operative wound infection was important cause for development of Incisional hernias.

Size of the defect and presence of complication are the guiding factors for choosing the type of repair. Simple suture repair or Mayo's repair was the choice of repair in children and in emergencies in all age groups. It was done for all verities of ventral hernias with smaller defect size.

Mesh repair is the technique of choice for most of Incisional hernias and for all ventral hernias with large defect. Though sub lay/underlay mesh placement was more physiological, hybrid was needed for that. so was placed either inlay or on lay.

Laparoscopic approach for ventral hernia repair is definitely method of

choice with the advantages of good operative field visibility, lessened duration of hospital stay, minimal post operative scar. Though cost of surgery and surgical expertise limited our study, complications in both open approach and laparoscopic approach remain same.

Mesh repair can be combined with elective bowel surgeries provided careful pre operative preparation of the patient, meticulous dissection, complete haemostasis, and proper post operative care is given. This still needs further studies in this regard.

Follow up of patients was done at interval of 1, 6, 12, 18 months. All patients were contacted personally; however15 patients lost for follow-up, due to inaccessibility. Of all the patients followed up 2cases developed recurrence during the study period.

INCISIONAL HERNIA PREVENTIVE MEASURES :

1. Correction of risk factors before taking up for surgery in elective cases:

   - Stop smoking, alcohol.
   - Controlling blood sugar and hypertension.
   - Treating local dermatological problems.
   - Reduction of weight.

2. Better surgical techniques:

   - Transverse incisions when possible
   - Avoiding muscle cutting incision.
   - Minimal tissue handling.
   - Good hemostasis.
   - Tension free repair: Allow for mesh contraction of 30%
   - Rectus closure: nonabsorbable,continuos adequate length of 4:1,at 1cm interval.

3. Control of sepsis.

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ANNEXURE – 1

PROFORMA:

1. Case no

2. Name

3. Age

4. Sex

5. Occupation

6. Religion

7. Socio – Economic status

8. Address

9. Unit

10. MR. NO.

11. Date of Admission

12. Date of Operation

13. Date of Discharge

Chief Complaints; 1. Swelling- yes/no if yes- duration

2. Pain yes/no if yes- duration

3. Any other

History of present illness

1. Swelling – - Duration

- Site

-Size

- On set: in relation to previous surgery.

- Rate of Progression

- Relation with straining

- Reducibility – Spontaneous

- Postural

- Manual

- Irreducible

Aggravating and relieving factors

Associated symptoms

2. Pain Abdomen: - Duration

- Site

- On set

- Progression

- Relation to exertion

-Continuous/intermittent

-Radiating/non radiating

- Nature – Dragging

- Dull aching

- Colicky

- Burning

-Aggravating and relieving factors

-Associated symptoms

3. Other symptoms LUTS / prostatism, constipation, painful or painless bleeding per rectum, cough with or without production, breathlessness, chest pain. Fever

Past History

- Obesity
- DM
- HT
- TB
- CBA
- BPH
- Jaundice
- Epilepsy

- On any drugs

- Drug/latex allergy

- Surgery – indication, Type of operation – Elective / Emergency

Time

Anatomical Site

Type of incision

Drain through main wound

Post operative cough / RI/Distention

Infection of laparotomy wound

Early post op wound dehiscence

Operated for inguinal hernia before or not

Follow up in relation to previous surgery

(Any pain, Vomiting, Constipation, Irreducibility)

Personal History

- Diet

- Appetite

- Sleep

- Bowel & Bladder
- History of tobacco consumption
- History of Alcoholism
- Any other habits.

In case of females-

Married life

Parity index

LMP

Tubectomy status

Family History – Similar Complaints in the family

Physical Examination

- Appearance
- Built
- Nourishment
- Height
- Weight

- BMI
- ASA grade
- Pallor
- Edema
- Clubbing
- Cyanosis
- Icterus
- Lymphadenopathy
- Pulse
- BP
- Temperature
- Rate of Respiration
- Hydration

Systemic Examination

- CVS
- RS
- CNS
- LMS

Per abdomen;

Shape of the abdomen

- Umbilicus – Situation

– Displacement

– Eversion

- Distention of abdomen

- Abdominal scars

- Engorged veins /arterial pulsation

- Hernial orifices

Swelling-number

- Position

- Extent

- Size

- Shape

- Surface

- Borders

- Reducibility.

- Visible peristalsis

- Impulse on coughing

- Skin over the swelling

Palpation

- Temperature
- Tenderness
- Consistency
- Reducibility
- Contents
- Feel of the gap / defect size
- Rigidity
- guarding
- Mass per abdomen

Percussion - Over the swelling Fluid Thrill **Auscultation**

Examination of Tone of Abdominal Musculature

- Head rising
- Leg rising
- Valsalva maneuver

Examination of external genitalia

- Phimosis

- Meatal stenosis,,- Urethral stricture

P/R

P/V

P/S

Diagnosis

Investigations

- Hb%

- TC

- DC

- ESR

- BT CT

- Blood Group

- FBS

- PPBS

- Blood Urea

- Serum Creatinine

_proteins

- HIV
- HBS Ag
- Urine Routine
- ECG
- Chest X ray PA view
- USG abdomen &pelvis

When needed

- LFT

--Fasting Lipid profile

- Erect X ray abdomen
- Echocardiogram

- CT abdomen,etc

Epigastric Hernia

Name	Age	Sex	IP No	Occupation	BMI	Symptom	No of Defect	Defect Size	Type	Repair
Mathialagan	45	m	53736	Sedantary	>25	P	Single	<3cm	EL	Anatomaical
Mariammal	46	F	6749	Field Worker	<25	S	Multiple	>6 cm	El	Mesh
Shanmugasundar	52	m	28572	Field Worker	>25	P	Single	<3cm	EL	Anatomaical
Tirumalai	31	F	28440	Field Worker	>25	P	Single	3-6 cm	EL	Anatomaical
Saroja	50	F	49020	Field Worker	>25	P	Multiple	3-6 cm	El	mesh
Malairajan	60	M	38733	Field Worker	<25	S	Multiple	>6 cm	El	Mesh
Maideen Pitchai	50	M	16391	Field Worker	>25	P	Multiple	3-6 cm	El	Mesh
Raj	35	M	26146	Field Worker	>25	P	Multiple	3-6 cm	El	Mesh
Uykatan	52	M	26173	Sedantary	>25	P	Multiple	3-6 cm	Em	Mesh
Arasi	47	F	40092	Field Worker	<25	P	Multiple	3-6 cm	El	Mesh
Meera Maideen	46	M	18134	Field Worker	<25	S	Multiple	>6 cm	El	Mesh
Udaiyar	67	M	2345	Field Worker	<25	S	Multiple	>6 cm	El	Mesh
Sundar raj	46	M	37192	Field Worker	>25	S	Multiple	>6 cm	El	Mesh
Manickam	52	M	39701	Field Worker	>25	P	Multiple	3-6 cm	El	Mesh
Kadarkarai	56	M	12258	Field Worker	>25	S	Multiple	3-6 cm	El	Mesh
Muthuveeran	55	M	3946	Field Worker	<25	P	Multiple	3-6 cm	El	Mesh
Chellaiah	65	M	6252	Field Worker	<25	P	Single	<3cm	EL	Anatomaical
Gurunathan	25	M	28807	Sedantary	<25	P	Single	<3 cm	EL	Anatomaical

Pushpanathan	35	M	5777	Field Worker	>25	P	Multiple	3-6 cm	El	Mesh
Rengaswamy	50	M	38681	Field Worker	>25	P	Multiple	3-6 cm	El	mesh
paramasivan pillai	70	M	4251	Field Worker	>25	P	Single	3-6 cm	EL	Mesh

Abb : M – Male F – Female S – Swelling P – Pain EL - Elective EM – Emergency

Incisional hernia

S no	Name	Age	Sex	Ip No	Symptom	Prevsurgery -el/em	Incision	Duration	Defect size	Risk factor	REPAIR
1	Dhanalakshmi	50	F	4855	S	PS	Transverse	>5 yrs	<3 cm	INF	Anatomical
2	Natarajan	55	M	5927	P	L-EM	Rpm	>5 yrs	3-6 cm	Smoking	DBM
3	SathyaSundari	29	F	9422	p	LS	Port Site	2-5 yrs	3-6 cm	Anaemia	DBM
4	Rajeswari	43	F	20826	S	LSCS-Em	Midline	<2 yrs	<3 cm	INF	Anatomical
5	Gomathy	25	F	21964	S	L-EM	Midline	<2 yrs	>6cm	MRD	OM
6	Muthulakshmi	43	F	22046	P	LSCS-Em	Midline	>5 yrs	3-6 cm	INF	DBM
7	Kajalbeevi	50	F	23303	S	L-EM	Midline	<2 yrs	3-6 cm	CAHD	DBM
8	Sornam	60	F	32176	P	LS	Port Site	>5 yrs	3-6 cm	Anaemia	DBM
9	Veeralakshmi	25	F	41274	S	LSCS-Em	Midline	>5 yrs	>6 cm	INF	OM
10	Mariyammal	65	F	42405	P	L-EL	Rpm	2-5 yrs	<3 cm	CAHD	Anatomical
11	Sakunthala	52	F	470872	S	LS	Port Site	>5 yrs	3-6cm	Pneumonia	DBM
12	Bagavathy	52	F	55602	P	L-EL	Rpm	<2 yrs	3-6 cm	DM	DBM
13	Subbulakshmi	28	F	60434	S	APP-EM	McBurney	<2 yrs	<3cm	INF	Anatomical
14	Ponnuswamy	35	M	60546	S	RECURRENT	Transverse	<2 yrs	3-6 cm	Smoking	OM
15	Ratheesh	45	F	5436	P	LSCS-Em	Midline	<2 yrs	>6 cm	INF	OM
16	Subbaiah	70	M	14996	P	L-EM	Midline	>5yrs	3-6 cm	Smoking	DBM

17	Shanmuga sundari	42	F	19223	S	LS	Port Site	2-5 yrs	>6cm	Anaemia	OM
18	Arulmari	37	F	32814	P	LSCS-Em	Pf	>5 yrs	>6 cm	Pneumonia	OM
19	Kanaga	68	F	33401	S	LSCS-Em	Midline	>5 yrs	>6 cm	Anaemia	OM
20	Karpagavalli	29	F	50431	S	LSCS-Em	Midline	>5 yrs	>6 cm		OM
21	Subramanian	68	M	36357	P	L-EM	Midline	2-5 yrs	>6 cm	Smoking	OM
22	Lakshmi	45	F	37640	S	LSCS-Em	Pf	>5 yrs	>6 cm		OM
23	Venkatachala Perumal	56	M	14835	S	L-EM	Rpm	<2 yrs	<3 cm	COPD	Anatomical
24	Prema	48	F	14741	S	LS	Port Site	<2 yrs	3-6 cm	Pneumonia	DBM
25	Subammal	65	F	19056	P	L-EM	Rpm	>5 yrs	>6cm	DM	OM
26	Muthumari	50	F	13485	S	LSCS-EM	Midline	>5 yrs	>6 cm	DM	OM
27	Mariya thangam	62	F	37528	S	CHOLE	subcostal	<2 yrs	<3 cm	DM	Anatomical
28	Sabrual	40	F	1882	S	LSCS-Em	Midline	<2 yrs	3-6 cm	Pneumonia	Inlay
29	Balaya	52	M	16096	S	L-EM	Rpm	<2 yrs	3-6 cm	COPD	Inlay
30	Maha lakshmi	43	F	20549	S	LSCS-Em	Pf	>5 yrs	>6 cm		OM
31	Muthu lakshmi	37	F	41090	P	LSCS-Em	Midline	2-5 yrs	3-6 cm	INF	DBM
32	Gomathi	52	F	53500	S	LSCS-Em	Midline	>5 yrs	3-6 cm	INF	DBM
33	Velladurai	53	M	24113	S	APP-EM	McBurney	2-5 yrs	<3cm	Pneumonia	Anatomical
34	Seetha lakshmki	63	F	37154	P	APP-EM	McBurney	>5 yrs	3-6 cm	INF	DBM
35	Sudalai ammal	57	F	38445	S	Drainsite	R lumbar	<2 yrs	3-6 cm	DM	DBM
36	Vellammal	50	F	54255	P	LSCS-EL	Pf	>5 yrs	>6cm		OM

37	Pattathy	50	F	20154	S	L-EM	Rpm	2-5 yrs	3-6 cm	DM	DBM
38	Kalaiarasi	29	F	43034	P	APP-EL	McBurney	>5 yrs	<3 cm	Anaemia	Anatomical
39	Prema	38	F	44248	S	LS	Port Site	>5 yrs	<3 cm	Anaemia	Anatomical
40	Sudalai	47	F	44253	S	LSCS-EL	Pf	2-5 yrs	<3 cm	COPD	Anatomical
41	Muthu lakshmi	39	F	45472	P	LS	Port Site	<2yrs	3-6 cm	COPD	DBM
42	shanthi	32	F	6239	P	L-EM	Midline	<2yrs	>6 cm	DM	OM
43	Anitha John	52	F	12041	P	CHOLE	subcostal	>5 yrs	3-6 cm	CAHD	DBM
44	Jagajyothi	57	F	13323	S	LSCS-EM	Midline	>5 yrs	3-6 cm	Pneumonia	DBM
45	Lakshmi	35	F	21192	S	LS	Port Site	2-5 yrs	<3cm	DM	Anatomical
46	Gomathy	52	F	18778	S	Hysterectomy	Midline	>5 yrs	3-6 cm	DM	Underlay
47	Grace	65	F	21181	S	Hysterectomy	Midline	>5 yrs	<3cm	Anaemia	Anatomical
48	Maha lakshmi	39	f	37084	S	LSCS-EM	Pf	2-5 yrs	3-6 cm	Anaemia	Underlay
49	Catherni	36	F	41618	S	PS	Transverse	<2 yrs	<3 cm	Pneumonia	Anatomical
50	Ashabeevi	55	F	42793	S	PS	Transverse	>5 yrs	3-6 cm	COPD	Underlay
51	Kanni ammal	45	F	47498	S	PS	Transverse	2-5 yrs	<3 cm	INF	Anatomical
52	Jayakodi	52	F	53343	S	LS	Port Site	>5 yrs	>6cm	DM	OM
53	Valar mathy	45	F	56092	S	LSCS-EL	Pf	2-5 yrs	<3cm	DM	Anatomical
54	Vellammal	37	F	57185	S	LSCS-EL	Pf	2-5 yrs	<3 cm	DM	Anatomical
55	Maryammal	46	F	3036	S	Hysterectomy	Pf	<2 yrs	<3 cm	CAHD	Anatomical
56	Muthu lakshmi	60	F	5837	S	LSCS-EM	Pf	>5yrs	3-6 cm	INF	OM
57	Selvi	39	F	10137	S	Hysterectomy	Pf	> 5yrs	3-6 cm	Anaemia	OM

58	Santhana vadivu	45	F	19693	S	LS	Port Site	<2 yrs	<3cm	Pneumonia	Anatomical
59	Tamilarasi	41	F	25381	S	L-EL	Rpm	<2 yrs	<3 cm	MRD	Anatomical
60	Mariammal	53	F	30636	S	Hysterectomy	Midline	2-5 yrs	>6cm	Anaemia	OM
61	Esakiammal	63	F	33838	S	LSCS-EM	Midline	2-5 yrs	3-6 cm	Anaemia	OM
62	Gunareeli	58	F	42114	S	L-EM	Midline	>5yrs	<3 cm	Pneumonia	Anatomical
63	Murug eswari	30	F	14254	S	Hysterectomy	Pf	<2 yrs	3-6 cm	DM	OM
64	Govind ammal	40	F	18601	S	LSCS-EL	Midline	>5 yrs	3-6 cm	COPD	OM
65	Sudha	24	F	33499	p	L-EM	Rpm	>5 yrs	3-6 cm	DM	OM
66	Muthu lakshmi	47	F	39202	S	L-EM	Midline	2-5 yrs	>6 cm	Pneumonia	OM
67	Mariyaschi	32	F	40372	S	L-EM	Rpm	<2 yrs	>6 cm	Anaemia	OM
68	Elangamani	70	F	42609	S	Hysterectomy	Midline	2-5 yrs	>6 cm	Anaemia	OM
69	Angelmary	35	F	59488	P	PS	Transverse	<2 yrs	<3 cm	Anaemia	Anatomical
70	Suriya narayanan	35	M	15206	P	Iliac crest bone graft	Port Site	>5 yrs	<3 cm	Anaemia	Anatomical
71	Rajapandian	40	M	36785	P	L-EM	Midline	>5 yrs	3-6 cm	DM	OM
72	Subbu lakshmi	50	F	21220	S+P	Hysterectomy	Midline	2-5 yrs	3-6 cm	DM	OM
73	Parvathy	28	F	11236	S+P	LS	Port Site	2-5 yrs	<3 cm	Pneumonia	Anatomical
74	Gnana sekhar	60	M	1243	S+P	L-EL	Midline	>5 yrs	3-6 cm	Smoking	OM
75	Indira	68	F	54563	S+P	LSCS-EL	Midline	>5yrs	>6cm	Pneumonia	OM
76	Ranjitham	35	F	521965	S+P	LSCS-EL	Pf	>5yrs	3-6cm	Pneumonia	OM
77	Mala	65	F	22799	S+P	PS	Transverse	>5yrs	3-6cm	Pneumonia	OM
78	Amudhan	45	M	49770	S+P	L-EL	Rpm	>5yrs	3-6cm	DM	OM

79	Thanga selvi	28	F	47967	S+P	LS	Port Site	2-5 yrs	3-6 cm	Anaemia	OM
80	Petchi ammal	62	F	44033	S+P	PS	Transverse	>5 yrs	> 6cm	Anaemia	OM
81	Chidambaram	32	F	6827	S+P	LS	Port Site	<2 yrs	<3 cm	Anaemia	Anatomical
82	Pushpam	50	F	42312	S	LS	Port Site	>5 yrs	>6cm	Anaemia	OM
83	Ganapathy sankara vadivu	46	F	45746	P	RECURRENT	Transverse	2-5 yrs	>6 cm	DM	OM
84	Pappathi	45	F	51113	S	PS	Transverse	>5yrs	3-6 cm	Pneumonia	OM
85	Lakshmi	35	F	49245	S	LSCS-EL	Midline	>5 yrs	3-6 cm	Anaemia	OM
86	Ganapathy	48	F	52154	P	RECURRENT	Transverse	>5 yrs	3-6 cm	INF	OM

Abb : PS – Puerperal Sterilisation L- Laparotomy LSCS – Caesarean Section APP – Appendicectomy Chole – Cholecystectomy S – Swelling P – Pain OM – Onlay Mesh DBM – Double Breasting Mesh INF – Infection MRD – Medical Renal Disease CAHD – Coronary Artery Heart Disease

Umbilical Hernia

S.No	Name	Age	Sex	IP No	BMI	Symptoms	Type	Size of Defect	Repair
1	InnasiMuthu	76	M	15186	<25	P	UH	<3 cm	Anatomical
2	Sermaganapathy	42	M	15185	>25	S	PUH	3 - 6 cm	A+O
3	Janaki	39	F	17293	<25	S	UH	3 - 6 cm	Mayo
4	Elizabeth Rani	58	F	8430	>25	S	PUH	3 - 6 cm	A+O
5	Mookammal	49	F	7071	>25	P	PUH	<3 cm	Anatomical
6	Paul Raj	65	M	1368	<25	S	UH	>6	A+O
7	Tharathi	90	M	22037	>25	S	PUH	3 - 6 cm	A+O
8	Shanmugavadivu	57	F	24582	>25	S	PUH	3 - 6 cm	Inlay
9	KakumPerumal	56	M	24582	>25	P	UH	<3 cm	A+O
10	Arumugam	60	M	31053	<25	S	UH	3 - 6 cm	A+O
11	Srinivasan	45	M	34499	>25	S	PUH	3 - 6 cm	A+O
12	Pushpam	51	F	35405	>25	P	PUH	<3 cm	Anatomical
13	Sudalai Muthu	53	M	41218	>25	S	PUH	3 - 6 cm	A+O
14	Murugesan	13	M	167	<25	C	UH	3 - 6 cm	A+O
15	Saroja	50	F	5407	>25	S	UH	3 - 6 cm	A+O

16	Thanushkodi	70	M	11015	>25	S	PUH	>6	A+O
17	Ramani	40	F	11007	>25	S	PUH	3 - 6 cm	Mayo
18	Pappa	57	F	12388	<25	S	UH	3 - 6 cm	A+O
19	Sabarimuthu	45	M	12452	>25	P	UH	<3 cm	A+O
20	Dhanalakshmi	50	F	37909	>25	P	UH	<3 cm	Anatomical
21	Namthapandi	67	M	50422	<25	S	UH	3 - 6 cm	A+O
22	Valli	50	F	50479	>25	S	PUH	3 - 6 cm	Inlay
23	Subbammal	13	F	57775	>25	C	UH	3 - 6 cm	A+O
24	Aiyappan	60	M	60508	>25	S	PUH	3 - 6 cm	A+O
25	Veeramani	40	M	4417	>25	P	UH	<3 cm	A+O
26	Shanmugam	60	M	12119	>25	S	PUH	3 - 6 cm	Mayo
27	Rajaraman	37	M	35554	<25	S	UH	3 - 6 cm	Mayo
28	Jeyanumbu	45	F	32521	>25	P	UH	<3 cm	Anatomical
29	Rahmath	47	M	33062	>25	S	PUH	3 - 6 cm	A+O
30	Baca	42	F	31419	>25	S	PUH	>6	A+O
31	Sudalai vadivu	78	M	46684	>25	P	UH	<3 cm	Anatomical
32	Thivanoti	37	M	6955	>25	S	PUH	3 - 6 cm	Mayo
33	Periyasamy	36	M	7997	<25	S	UH	3 - 6 cm	Mayo

34	Arumugathai	44	F	78135	>25	S	PUH	3 - 6 cm	A+O
35	Sivalinga Perumal	65	M	3144	>25	P	UH	<3 cm	Anatomical
36	Gangammal	60	F	3082	>25	S	UH	3 - 6 cm	A+O
37	Ram Sundar	42	M	19892	>25	S	PUH	3 - 6 cm	A+O
38	Petchi	42	F	39712	<25	S	UH	3 - 6 cm	Underlay
39	Sundar Singam	72	M	42278	>25	P	UH	<3 cm	A+O
40	Murugan	30	M	50908	>25	S	PUH	3 - 6 cm	Mayo
41	Alagu Selvi	34	F	7631	>25	S	PUH	>6	A+O
42	Chellamal	68	F	17751	<25	S	UH	3 - 6 cm	Underlay
43	Subammal	60	F	18959	>25	P	UH	<3 cm	Anatomical
44	Revathy	50	F	23888	>25	P	UH	<3 cm	Anatomical
45	Antony Muthu	65	M	50900	>25	S	PUH	3 - 6 cm	A+O
46	Murugan	44	M	58654	<25	S	UH	3 - 6 cm	A+O
47	Kammaraj Mohammed	62	M	9125	>25	P	UH	<3 cm	Anatomical
48	Pichammal	42	F	13047	>25	S	PUH	3 - 6 cm	A+O
49	Sorimuthudeven	62	M	4036	>25	P	UH	<3 cm	A+O
50	Prema	36	F	21210	>25	C	UH	3 - 6 cm	A+O

51	Alwar	37	M	27534	>25	P	UH	<3 cm	Anatomical
52	Muthulakshmi	35	F	28835	>25	S	PUH	3 - 6 cm	Mayo
53	Murugan	17	M	32534	<25	C	UH	3 - 6 cm	Underlay
54	Nelson	34	M	33695	>25	S	UH	3 - 6 cm	Mayo
55	Madasamy	48	M	10154	>25	P	UH	<3 cm	Anatomical
56	Rajathi	28	F	18354	>25	S	PUH	3 - 6 cm	Mayo
57	Petchiammal	30	F	22465	<25	S	UH	>6	A+O
58	Mydeenbath	50	M	17478	>25	S	PUH	3 - 6 cm	A+O
59	Jahan Ali	51	M	19793	>25	S	PUH	3 - 6 cm	A+O
60	Sankar	48	M	37250	>25	S	PUH	3 - 6 cm	Underlay
61	Bharusal Beevi	73	F	33521	<25	S	UH	3 - 6 cm	A+O
62	Yesuvadiyal	85	F	33531	>25	S	PUH	3 - 6 cm	A+O
63	Rajkumar	48	M	33527	<25	S	UH	>6	Underlay
64	Shanmugathai	37	F	57840	>25	S	PUH	3 - 6 cm	Mayo
65	Saraswathy	60	F	55775	>25	S	PUH	3 - 6 cm	A+O
66	Chelladurai	40	M	58260	>25	S	PUH	3 - 6 cm	Mayo
67	Papathy	60	F	11215	<25	P	UH	<3 cm	Anatomical
68	Masana Muthu	55	M	26849	>25	S	PUH	3 - 6 cm	A+O

69	Lakshmi	68	F	35106	>25	S	PUH	3 - 6 cm	A+O
70	Uthaman	44	M	40508	<25	S	UH	>6	Underlay
71	Sundari	23	F		>25	P	UH	<3 cm	A+O
72	Rama Chandran	54	M		<25	S	UH	3 - 6 cm	A+O
73	Nainar	60	M	49656	>25	S	PUH	>6	A+O
74	Shanmuga Sundaram	67	M	50783	<25	S	UH	3 - 6 cm	A+O
75	Subbaiah	45	M	23582	<25	S	UH	3 - 6 cm	A+O

S – Swelling P – Pain UH – Umbilical Hernia PUH - Para Umbilical Hernia A+O – Anatomical + Onlay